March/April 198
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AMIGA WORLD

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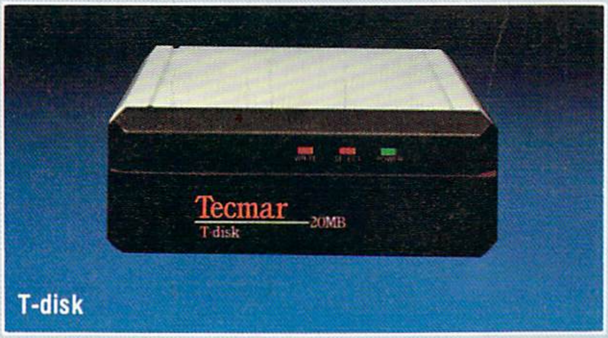
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AMIGA WORLD

Volume 2, Number 2, ***March/April*** *1986*

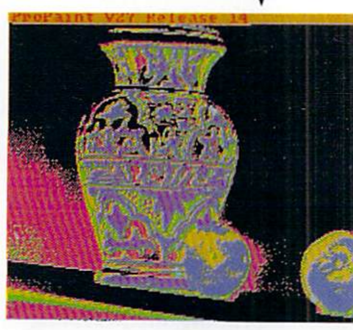
Features



Articles

Columns

Departments



AMIGA WORLD

Volume 2, Number 2, ***March/April*** *1986*

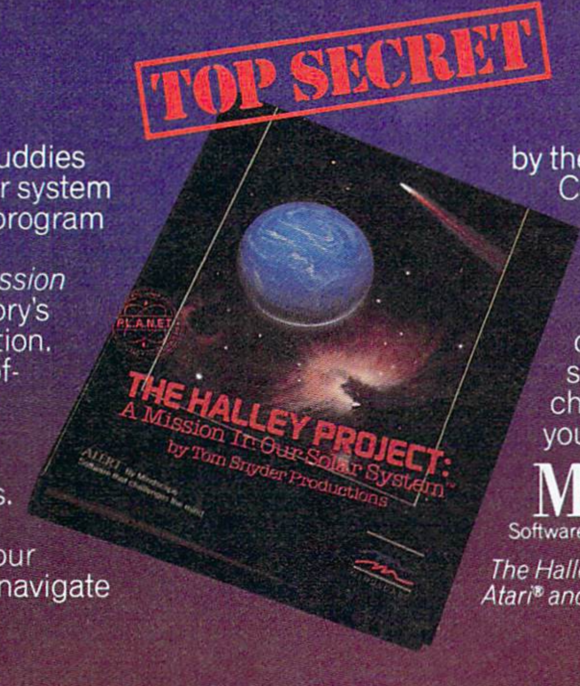
Cover
Design: *Glenn A. Suokko*
Photography: *Ed Judice*
Separations: *Ultra Scan*
Printing: *Brown Printing*

AmigaWorld (ISSN 0883-2390) is an independent journal not connected with Commodore Business Machines, Inc. *AmigaWorld* is published bimonthly by CW Communications/Peterborough, Inc., 80 Pine St., Peterborough, NH 03458. U.S. subscription rate is $19.97, one year. Canada and Mexico $22.97, one year, U.S. funds drawn on U.S. bank only. Foreign Surface $39.97. Foreign Air Mail $74.97, U.S. funds drawn on U.S. bank. Second class postage pending at Peterborough, NH, and at additional mailing offices. Phone: 603-924-9471. Postmaster: Send address changes to *AmigaWorld*, Subscription Services, PO Box 954, Farmingdale, NY 11735. Nationally distributed by International Circulation Distributors. *AmigaWorld* makes every effort to assure the accuracy of articles, listings and circuits published in the magazine. *AmigaWorld* assumes no responsibility for damages due to errors or omissions.

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Circle 3 on Reader Service card.

By Steve Twombly

Microevolution

The microcomputer industry held its annual Computer Dealer Exposition, better known as Comdex, in Las Vegas last November. At the show, computer dealers were able to see impressive displays of the latest hardware and software products developed for microcomputers. After attending this latest Comdex, I returned with more insight into the Amiga's place in the evolution of microcomputer technology. Coincidentally, Comdex 1985 marked the passage of the first year since we at *AmigaWorld* had our first look at a prototype Amiga.

As an owner of the new Amiga, you are on the leading edge of the evolution of microcomputer technology, since you now own the most unique personal computer to come to market in the history of the industry.

In the evolution of the personal computer, there have been two major forces at work. The creators, such as electronic engineers and programmers whose research and inventions have pioneered the development of the microcomputer, are the first major force propelling micro evolution. They are motivated by a search for the most advanced combinations of components and new technology in hardware and software development. The force behind technological growth is propelled by a quest for processes or applications that reach beyond the capabilities or expectations of current commercial products.

The other force that propels micro evolution is consumer demand. Personal computers have changed and evolved because of the shifting needs of you, the microcomputer user.

The microcomputer came into being as a do-it-yourself electronics project for hobbyists familiar with mainframe computers and electronics. The first micros were assembled from kits or from scratch; they had a miniscule (1K) amount of RAM and no keyboard. These early micros, which had little practical application, were also expensive to build. Next, the TRS-80 and Apple II computers were introduced as interest and demand for microcomputers began to grow among consumers. The TRS-80 brought increased production and widespread availability of micros to users. The Apple II introduced the concept of an open system, which allowed a large support market of add-on products and software to develop and grow.



Next, inexpensive home computers arrived on the scene, bringing high-quality color graphics and computer-generated sound to users. This phase of the evolution of micros is exemplified by the Commodore 64 and Radio Shack Color Computer, and was greeted with enormous demand from consumers. At about the same time, IBM introduced its PC, combining the open architecture of the Apple II with more memory to create a powerful new microcomputer for the business market. The evolution of this product has been propelled by the addition of more and more memory and faster processing speeds in addition to a strong support market for software and peripherals, meeting the needs of power users, who are primarily involved in large businesses. Eight-bit processors have given way to 16- and 32-bit processors in the evolution of the micro.

The next major leap in the evolution of microcomputers came about because of the difficulty consumers had in trying to master MS-DOS and other operating systems. A new and more intuitive interface evolved and took its form with the Apple Lisa and Macintosh computers.

The strongest forces in micro evolution have been consumer demand for increased price/performance ratios, new and useful applications with particular emphasis on high-resolution graphics and sound, and ease of use through an intuitive user interface. Each pre-Amiga microcomputer has been able to address one or even two of these requirements, but never have all three been addressed in one machine.

The Amiga personal computer is on the leading edge of the evolution of the micro because its creators have answered and combined all three consumer demands in one product. To describe all of the Amiga's features is to review the accomplishments of a variety of disparate systems in the history of micro evolution. It has the open architecture of the Apple II, the ease of use of the Macintosh and the power of the IBM PC.

As the Amiga began to make its presence felt at last year's Comdex, I sensed the energy of micro evolution coming alive again. ■

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Lattice Software
designed for AMIGA

Lattice,® recognized as an innovator in software development, has done it again. Only this time, Lattice is unveiling a full line of software packages for the new personal computer that gives you a creative edge — The Amiga by Commodore.

The revolutionary features of Amiga have drawn second looks from just about everyone. But while everyone was looking, Lattice was busy at work creating programmer tools and applications software that will give the word versatility a whole new meaning.

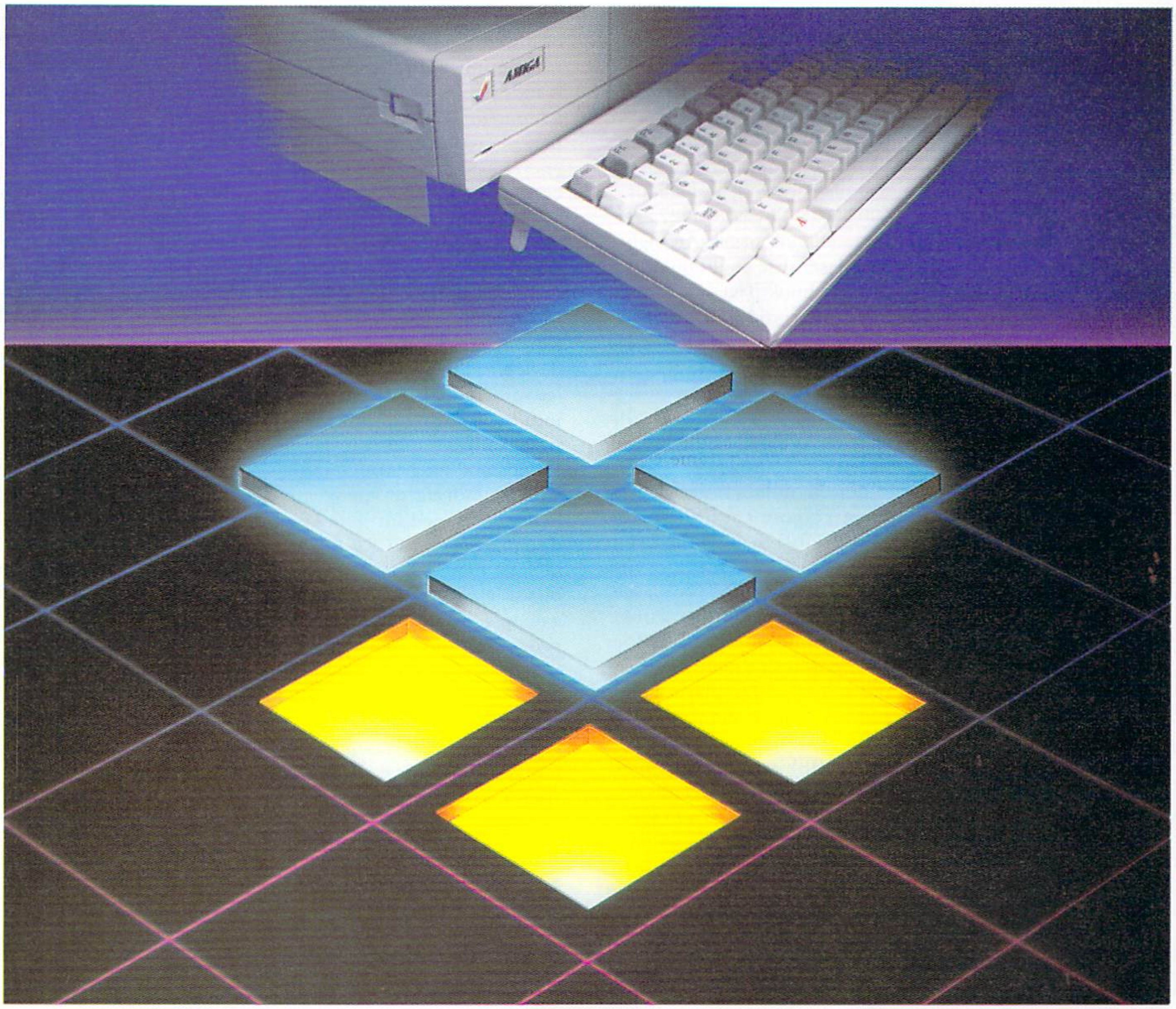
Programs like the *Lattice Screen Editor*™ with a unique multi-window environment for preparing and editing text. Or *Lattice Make Utility*™ for rebuilding complex systems at a single command. There's also *Lattice MacLibrary*™ with more than sixty C functions for those who feel close to Mac.

But these are just a few of the programs that have been created by Lattice for Amiga. Also available now are *Unicalc,® dBC III*™ and *Lattice Text Utilities.*™ And many more on the horizon.

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Zeitgeist

By Guy Wright

It's all done with mirrors. Lasers shine their coherent light through a series of mirrors, lenses and filters. A bounce or two later—and based on an incident of refraction, or distortion or some sort of high-tech, hocus-pocus digital information, video information or audio information—some manner of information is extracted and sent out to be processed or displayed or listened to. This, by itself, is not that remarkable. Video players, laser-disc players, cameras, etc., have been around for a while. Records, tapes, 8-tracks and cassettes have been around for a while. Floppy disks, hard disks, paper and magnetic tape have also been around for a while. Information is stored on some medium and retrieved somehow.

It is the combining of these elements through the Amiga (or any other microcomputer, for that matter) that is the interesting thing. Plus the fact that laser discs and CDs (compact discs) offer a few extras. Video, high-quality stereo sound and gigabytes of storage. That last part is worth repeating—GIGABYTES of storage.

The Amiga, straight out of the box, has 256K of memory. Subtract some for the Workbench and you end up with around 160K, which is 160,000 bytes, or 160,000 characters, or 32,000 words, or about 75 pages of a book. A megabyte is 1,000K and a gigabyte is 1,000 megabytes. So 10K = 10,000 bytes = 10,000 characters = 4.5 pages of a book. CD has over 500 megabytes of storage, or 500,000,000 bytes, or 227,272 average book pages. An eight-inch laser disc could hold 454,544 book pages. A 12-inch laser disc could hold about 1,454,540 book pages. *AmigaWorld* has 96 pages, so we could put 15,151 issues of *AmigaWorld* on one 12″ laser disc. 151,510 articles.... Boggles the mind, doesn't it?

But the numbers aren't everything. If those 151,510 articles aren't worth reading then you might as well use the laser disc as a frisbee. (By the way, laser discs are nearly indestructible. So you could use it as a frisbee, then pop it in the dishwasher, put it back in the player and still have a working disk.)

By the time you read this there will be a few companies selling write-once laser discs with 3.2 gigabytes of storage. Another company has an encyclopedia on CD. You can search the entire encyclopedia in seconds for every occurrence of a word or combination of words. You can display articles faster than text stored on hard disk. The trick is an amazing sleight of disc technique—every key word in the entire encyclopedia is indexed (think about that for a moment). What it means is that the index is larger than the encyclopedia. And the CD isn't even close to being filled!

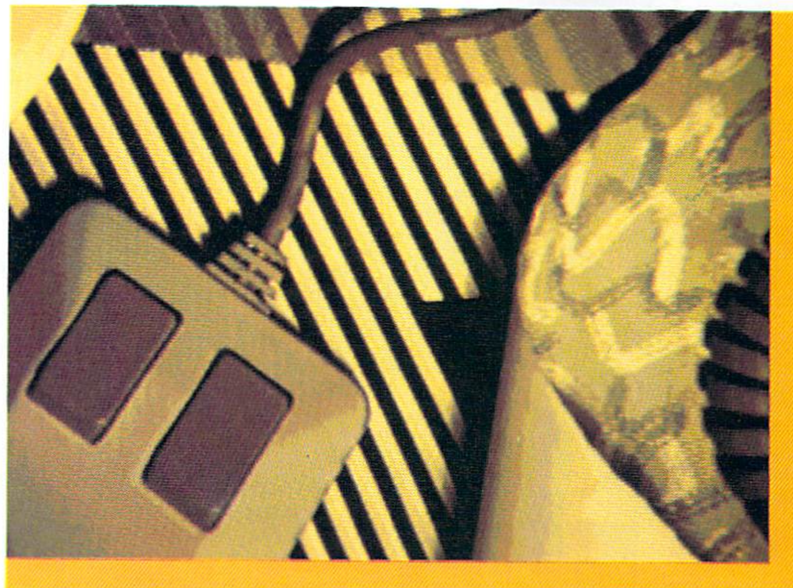
Very soon, a digitizer/frame grabber will be available for the Amiga that will let you freeze a video image from any video input, color it, paint it, print it, store it, etc. A gen-locking device will be available that will let you feed any video image into the Amiga and superimpose Amiga graphics, text, sounds and music. Interactive video authoring programs are being developed for both laser-disc players and VCRs. It won't be long before videoware (combination video and software) games, educational and business programs will be available.

People who buy computers are used to the idea that they are on the edge of some new technologies. The people who buy Amigas (and read *AmigaWorld*) are convinced that not only are they on that edge, they are leaning over and beginning to contemplate jumping. The Amiga/laser/video symbiosis should be a fairly giant step in the direction of a new way to think of computers. Rather than buying a computer and then connecting peripherals, people will buy an encyclopedia on CD and an Amiga computer to display the information, or a laser-disc player, training software, laser discs and an Amiga to run it through. Videoware, interactive video, laser discs and CD-ROMs are all within months, not years, of being available for the Amiga.

Elsewhere in this issue we have articles on music software, Intuition, Basic graphics and our usual fare of reviews (with a new review addendum, Best of Public Domain, which will highlight a different piece of freeware in each issue), more questions and answers, newsworthy tidbits and enough Amiga info to make the price of this issue palatable. ■

THE
AMIGA
TECHNICAL REFERENCE SERIES

The Creator's Edge



THE AMIGA TECHNICAL REFERENCE SERIES from Addison-Wesley gives software developers and programmers the key to unlocking the power and versatility of the Amiga Personal Computer.

Published with Commodore Business Machines, Inc., the series is written by the hardware designers and programmers who actually created the Amiga's hardware, built-in-software, and user interface. C and assembly language examples throughout provide clear illustrations of Amiga programming concepts. Comprehensive, these manuals are *the* definitive reference works for Amiga programmers.

Titles include:

AMIGA HARDWARE REFERENCE MANUAL
Provides detailed descriptions of the graphics and sound hardware of the Amiga and explains how the machine talks to the outside world through peripheral devices.

AMIGA ROM KERNEL REFERENCE MANUAL: LIBRARIES AND DEVICES
Provides a complete listing and description of the Amiga's built-in ROM routines and systems software which support graphics, sound, and animation.

AMIGA ROM KERNEL REFERENCE MANUAL: EXEC
Provides a complete listing and description of the built-in ROM routines and systems software which support the Amiga's multitasking capabilities.

AMIGA INTUITION REFERENCE MANUAL
Provides a complete description of Intuition, the Amiga user interface. Numerous examples and illustrations show how to create applications programs that conform to Intuition's guidelines.

All four volumes in the **AMIGA TECHNICAL REFERENCE SERIES** are available in April through your Amiga dealer, and wherever computer books are sold.

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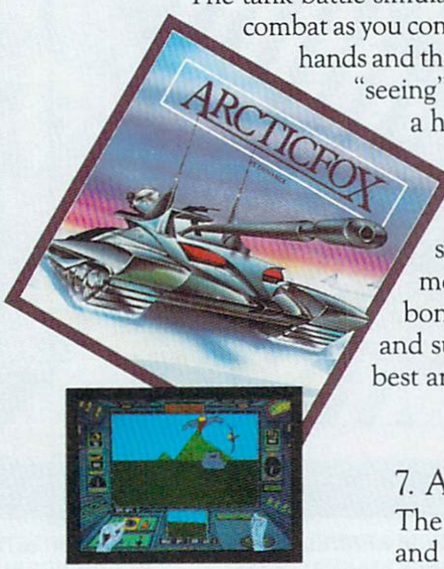
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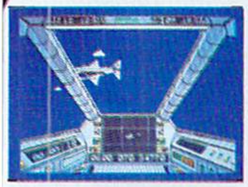
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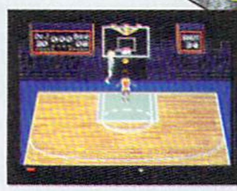
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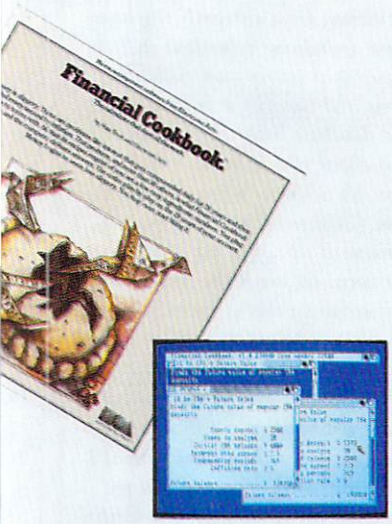
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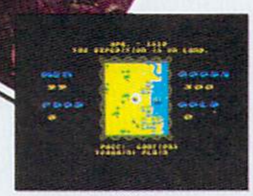
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Repartee

AmigaWorld *magazine has the usual overdose of hype that is to be expected from any new magazine devoted to a specific computer. But some statements in your November/December 1985 issue go beyond mere exaggeration, using false and misleading information in an attempt to portray the IBM PC as a slow, worthless computer.*

I am referring specifically to the first paragraph on page 25 ("In stark Contrast . . ."). The author quotes a Commodore spokeswoman's explanation for the reason an Amiga was so slow loading Lotus 1-2-3: namely, that the Amiga "totally emulates the IBM PC," including its speed. This comparison of the load time of Lotus 1-2-3 with an Amiga running native programs was supposed to demonstrate that the Amiga is tremendously faster than the IBM PC.

The comparison is obviously unfair. What Commodore or your AmigaWorld *writers should have done is compare a* real *IBM PC running Lotus 1-2-3 against an Amiga running the identical software in its PC emulation mode. I would bet that Commodore would have had great reason to be embarrassed by such a comparison.*

The next paragraph on page 25 also claims that the IBM PC is unable to perform true multitasking. This is only true if you stick to plain vanilla MS-DOS. There are a number of decent multitasking operating systems for the PC, including IBM's PC/IX (a UNIX look-alike), and Digital Research's Concurrent PC-DOS. Both of these also support additional users on serial terminals. There are also DOS add-on products (like Quarterdeck's DesQView or Microsoft's Windows) that add multitasking in reasonably elegant fashion to MS-DOS. The article denies the existence of these products, and implies that somehow the PC is inherently incapable of performing multitasking.

Then, in the first paragraph on page 21 of the same issue ("The Right Stuff. . ."), the claim is made that MS-DOS users must "master esoteric and difficult DOS commands to perform common functions like copying files." What could be so esoteric about a DOS command like "COPY A:MYFILE B:"? Using a visual interface like GEM or the Macintosh to perform the same operation involves steps like these:

**Double-clicking on two different disk icons to open the disk windows.*
**Resizing or scrolling one or two windows so that the source file can be seen on the screen together with the destination window.*
**Dragging the source file from one window to the other.*
**Clicking on an OK box in a dialog window to tell the computer to proceed with the copy operation.*

Using the mouse to perform these steps takes more time than I care to waste. I am not saying that the visual interface is useless; it is great for tasks that are very visual in nature, like drawing pictures. But it is unfair to dismiss DOS commands as unfriendly because they involve typing commands at a keyboard.

The point I am trying to make is not that the Amiga is a crummy machine. In fact, it looks very good. But your magazine should cease and desist from making false and untested claims about the supposed poor performance and difficulty of use of such machines as the IBM PC. Most of the information you publish about the PC is obviously based not on experience but on your own biases.

Mark Alexander
Pacific Grove, CA

I just thought that you would be interested to know that my Amiga has turned out to be a real lifesaver in more ways than one.

You see, I am currently employed as an ambulance attendant with a service that covers four expanding towns and villages. I use my Amiga as a database with which I record data about streets, roads and highways. So when we receive a call and I am not sure of the exact location, I summon it up using the database. The speed at which the Amiga allows me to do this is incredible and has already helped directly in saving time and ultimately saving lives.

I know that this in and of itself would not really merit any special attention other than the fact that I also use it for composing and sequencing my synthesizer and writing office memos at the same time.

Brent Moore
Quispamsis, NB Canada

That's what the Amiga is all about. Bravo! **—Editors**

I think it's great that you started a magazine devoted entirely to the Amiga. However, I'd like to see some programs in your magazine in the

future. All kinds of programs would be fine, but more importantly, some telecommunications programs would be the best.

Don Gordon
Oshawa, Ontario Canada

I just read issue #2 (Nov./Dec. '85) and I am impressed. Except for the cover, which seemed cold with its contrived high-rise business scene and manikin-like symbolic businessman, the issue sparkled with personality. You are successfully treading the line between accessibility and sophistication. . . like the Amiga itself. I can see how your articles could interest a beginner, yet with a few exceptions, there was enough technical information to keep the attention of experienced computer users. That means the editors are working hard!

Russell A. Dewey
Statesboro, GA

Would you believe that the cover shot for that issue is the view from our offices in Peterborough, New Hampshire? **—Editors**

I read with pleasure your new publication. I found the layout and graphics to be outstanding. However, in (Nov./Dec.), "300-word" modems, as well as "1200-word" and "2400-word" modems are referred to. The proper nomenclature is 300 BPS (Bits Per Second). This does not even roughly break down to 300 words a minute. As there are 8 bits to a byte (plus 2 or more for the transmission protocol), this is the rate then of 30 bytes a minute. This is roughly equivalent to 30 characters a minute (a character may be a blank or other non-viewable characters). Also, it is important to note that the transition protocols may not be correct for the computer you plan to communicate with. Therefore, before one goes out to purchase a modem, he should contact the staff with the other computer to find out what that computer needs. I have found that I have spent many hours on the telephone with someone trying to figure a way of making his software/hardware work with our system. Again, I want to thank you for a truly beautiful publication.

Louis P. Kairys
New York, NY

*I have read your article (*Zeitgeist*, Nov./Dec. '85, p. 8) about* AmigaWorld *and where it is going and I feel like responding. Even though the Amiga is my first computer, I have been subscribing to computer journals for the last three years.*

To start with, let's not fool ourselves about the Amiga becoming a business computer ovenight. It probably will one day, but business applications require powerful hardware (hard-disk drives, file servers, networks, support for daisywheel and laser printers) and software (word processing, spreadsheets, database management, networking), which is not available for the Amiga yet. If it becomes available, then let's talk business.

I suspect that Amiga buyers, like myself, bought their machines because they were intrigued by its power (graphics, speed, multitasking, memory access, expandability. . .). They are interested in how their machine works, and they would like to use it for programming and exploration in addition to regular uses like word processing, graphics, animation and sound.

At least for me, the purpose of your magazine is clear. The first year should be devoted to making the computer work and helping users become familiar with their machines. To accomplish this, AmigaWorld *should regularly interview people involved in the development of the Amiga. It should inform us about hardware and software problems of the machine. To do this, your magazine should have contact and supply information from Amiga users's groups, hardware and software developers and possibly a column where exchange of information can take place. Regular columns should include articles on languages, programming, operating systems, command line interface, MS-DOS emulation mode and programs and Workbench. Articles explaining other hardware and software functions (utilities) and use of the computer for disk and disk directories, as well as hints about peripherals support should be included.*

So far, I haven't seen articles about Commodore-Amiga and the people directly involved in the development of the Amiga, as well as their future plans. This should be the historical role of your magazine—to document the history of Amiga. No magazine should be without information on services available for computer users (public domain, information exchange, bulletin boards, Compuserve, databanks, user groups. . .). Brief news on future hardware and software development (including rumors) should be included. Hardware and software should be reviewed regularly.

On the negative side, the least appreciated information is hype. We all know we bought a good computer, but we don't need to hear it over and over. If there are problems (and there are, believe me), be sincere about it.

After one year (at least I think it will take that long to debug and implement the operating system and develop essential hardware and software), let the market decide what direction and content your magazine will have.

Julius A. Bazan
Glen Oaks, NY

Whew! It looks like we have our work cut out for us. Read on in this issue for information on programming, using Intuition, hardware and software reviews, product news, computing problems and solutions and more. **—Editors**

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Illustration by Island Graphics

ICON SELECT REVIEW

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You'll get outstanding color reproduction on high-quality, oversized pages. Instead of a reasonable facsimile, you'll see true-to-life examples of the Amiga's colorful graphics!





Illustration by Steven Lyons

Several years ago, Smith Klein Beckman Corporation created an interactive videodisc program that asked physicians to diagnose and treat a hypothetical patient. Based on the responses from the doctor, the patient's condition either improved or declined. The doctor then received advice or praise from the system. So far, no on-disc patients have died.

Interactive Videodisc Technology

By Matthew Leeds

Ford Motor Company recently began using interactive videodisc training centers to educate its repair technicians. The cost of sending instructors to every dealership had gone sky high, and it was not possible to bring techs from every dealership to Detroit several times a year to update their skills. Ford produced a series of videodiscs and supplemental training materials that were specific to each automobile model. The interactive nature of the training guaranteed that the technicians would receive personalized attention, and that the training would be consistent nationwide.

Interactive videodisc technology (IVT) is growing in popularity in business communications, training, education, promotion, consumer information and entertainment. Its growth can be directly attributed to the introduction of low-cost microcomputers. IVT allows a user to access visual information at his own pace, and to view only those portions that are pertinent to his needs.

The Video Pits

To understand why IVT has become so popular, we need to take an in-depth look at how it works. Videodiscs are commonly used to store visual and audio information, as in commercial movies and CD audio discs. Microscopic pits in the surface of the disc reflect a laser beam back to a read head. These pits are the encoded information, and can be read as on or off bits. New technologies allow for the storage of digital data on the same disc as visual and audio information. This mix of motion pictures, still frames, audio and data creates the potential for a high-powered information tool.

Two types of videodiscs are currently being used: Constant Angular Velocity (CAV) discs and Constant Linear Velocity (CLV) discs. The CAV disc turns at the same speed regardless of where the read head is on the disc. Each frame of video is written to a separate track. This means a single frame can be read from a single rotation, allowing for freeze frame, rapid search, multiple playback speeds and reverse play. The still-frame capacity is 54,000 frames, and the full motion capacity is 30 minutes. A CLV disc does not turn at the same rate at all times, and each rotation does not always contain a single frame. This increases the full motion storage time to an hour, but loses the still motion and variable playback speeds as well as the rapid search capability. Feature movies are usually released on CLV discs, and most IVT programs use CAVs.

Interactive videodisc systems are typically labeled by levels of interactivity. Level 1 is a linear-play program, with freeze frame, step motion, fast and slow motion, automatic pause and chapter-search (beginning of new section) capabilities supported by a special purpose ►

◄ ROM microprocessor built into the videodisc player. Level 2 programs use players that include a RAM section in the on-board microprocessor. This RAM can be loaded with data stored on one of the two audio tracks. In this fashion, it is possible to "program" the player to allow for branching (non-linear play) and to improve search times. Level 3 programs use a player interfaced to a computer. The computer can be connected to additional peripherals. Touch screens, light pens, disk drives, printers and other devices can be used to enhance the system. The computer is used to control the program flow, with software stored on disk.

Few Level 1 programs are being produced currently. Little incentive exists to create them, since videotape offers the advantage of low-cost duplicating and ready access to players.

Quite a few Level 2 programs are available, and some are still being produced. The advantages of Level 2 systems, lower hardware costs (no computer or interface needed) and lower production costs, are still attractive. Level 2 systems have their disadvantages, however, including problems of compatibility. For example, Sony and Pioneer manufacture Level 2 players, but their on-board microprocessors are not compatible. Some Level 2 videodisc producers have gotten around this by putting data for both systems on disc. The microprocessors are 1K only, and this limits the size of the controlling program. Also, once you produce the disc, the controlling software is "locked in" on the disc: Fixing bugs or making updates is impossible.

Level 3 programs currently offer the most power and flexibility. The videodisc player is controlled by a computer through an interface. The computer is used to handle the branching, store answers to questions, and can be reprogrammed at any time. Input can be through the keyboard, a lightpen, mouse, touch screen, joystick or other device. A Level 1 or 2 program cannot grade a session or store results for an instructor to examine, but a Level 3 program can. With video overlay capability, the computer can be used to display text or graphics on a video screen, pointing to a particular procedure or event.

The advantages of Level 3 programs are many. Ease of reprogramming of the software, storing of test results, computer-generated overlays, multiple input devices and program complexity are only some of the reasons why most IVT systems are using Level 3 technology.

With the increase in potential gains from using Level 3 comes a concomitant increase in potential problems. Interfacing a videodisc player to a computer is more difficult than connecting a printer, since no standards exist for either the hardware connections or the software to control the player. Sony players will not understand commands for a Pioneer player; an interface for a Panasonic player will not work on one from Hitachi. Software written to control a Level 3 disc using an IBM will not run on a Commodore 64. You begin to get the picture.

Videodisc interfaces are as varied as the computers they work on. Their levels of sophistication range from simply passing commands to the videodisc player, to overlaying graphics on the video signal and decoding digital dumps from the audio tracks or video frames. Some boards will support more than one brand of player, and can be controlled by software to handle future expansion.

Many industrial videodisc players have serial ports for connection to a controller interface. The cabling is similar to standard RS-232 devices, but some units use TTL (5V) voltage levels. Use *caution* if you try to create your own interface.

Quite a few companies are manufacturing interfaces. Two of the better known are Allen Communications and Whitney Educational Services.

Software

An interface is only the initial requirement for creating an interactive videodisc program. Software is needed to control program flow and branching. Menus need to be created to allow for choices on-screen. Data needs to be stored so that, for example, an instructor can evaluate student responses, or so that the program can replay sections that a student did poorly on. Two main types of authoring systems are available to assist in the creation of interactive control software: *aids* and *languages*.

Authoring *aids* are "toolkits" that assist a programmer in producing controlling software. Usually written in a high-level language like Basic or Pascal, toolkits are a collection of I/O (Input/Output) routines, text and graphics editors, videodisc player algorithms and other useful subroutines. Authoring *languages* allow the non-programmer to produce a controlling software program. They began as tools on mainframe computers where they were used to create computer-aided training programs. These languages use menus and simple commands to create finished interactive programs, so they may be thought of as development software for non-programmers. Authoring languages are more user-friendly, but less flexible, than authoring aids. They are designed for specific types of applications, and most often cannot be reconfigured by the user to meet an unanticipated need.

Most authoring languages being created today are being written in C because of its portability and speed of execution. Regardless of the system used, the creation of an interactive program requires more than programming skills. Training in the production of courseware (educational, subject-specific software), understanding the nature of attention spans, command

of the subject matter being presented and an understanding of the system's capabilities are all necessary for the production of an interactive program.

Education, Business, Elsewhere

Since 1980, the Videodisc Design/Production Group at the University of Nebraska in Lincoln has been using IVT to educate hearing-impaired children. These Level 1 and 2 discs were produced under a grant from the Corporation for Public Broadcasting. Known as the *Words in Motion* discs, they cover fingerspelling, parent/child language skills, tumbling skills, games and literature. The Design/Production Group has become a center for information on the applications of IVT.

Infodisc Corporation is supplying hundreds of high school placement offices with Pioneer videodisc players to assist college-bound students with the task of selecting a university. The package includes a collection of videodiscs with scenes of each college's campus, classrooms, dorms and labs. Also included is information on faculty, enrollment, financial assistance, curriculum and courses of study. Students can use a keypad to select presentations from each school they are interested in, and fill out a request for more information on individual schools.

Point-of-purchase (POP) displays are one commercial application that has caught on big in IVT. Sony has produced a kiosk for Cuisinart that allows customers to select short live-action segments on the use of food processors. Well-known chefs star in this never-ending soap opera of gourmet delights. A more sophisticated use was implemented by Nolan Bushnell's company, By Video. This stand-alone unit included a videodisc player, touch-screen monitor, credit card reader and keyboard. This computer-controlled kiosk displayed still and motion video catalogs of department store merchandise and accepted credit card purchases to be shipped to the customer's door. A current system is being distributed by CompuSave of Irvine, CA.

Visual Database Systems installed an IVT system at the California Academy of Science in San Francisco. The installation used a Mindset computer, two Pioneer videodisc players and a touch-screen monitor. The display was based on one of the Space Archive Volumes from Video Vision Associates. The museum has found the interactive display to be one of its most popular exhibits.

See For Yourself

If you want to assemble your own IVT system, get out your checkbook and start writing. I'll assume you already have a computer and a color monitor. A videodisc player will cost you around $700–$1000. (You can get them for less, but the seek time to find a given segment gets very long on low-cost units.) The high-end Pioneer units have seek times of less then three seconds (worst case) and the low-end unit (B210) takes 17 seconds. Let's say $1000 for a player.

Now you need an interface. If you are looking for one that can do overlays, the cost will be around $1000. A straight controller starts at $150. If you want to create your own courseware, the current cost to master a videodisc from tape is $300 for a single unit. This is assuming that you have done all of the video production already. Haven't started on the video yet? You might try using an existing videodisc for your first effort. The Space Archive Volumes would be a good start. Have you picked out your authoring language? *Insight* from Whitney Educational Services runs just under $1000, and the *Quest* language from Allen Communications costs half that. If you are proficient as a programmer, you could try writing your own program without using an authoring language. It's similar to writing a printer driver and then writing a paint program to go along with it.■

Address all author correspondence to Matthew Leeds, PO Box 210627, San Francisco, CA 94121.

If you are interested in getting more information on IVT, I suggest the following sources:

Videodisc Design/Production Group
University of Nebraska at Lincoln
PO Box 83111
Lincoln, NE 68501-3111

International Interactive Communications Society
330 Townshend St. #206
San Francisco, CA 94107

DiscTopics
Pioneer Video, Inc.
5150 East Pacific Coast Highway
Suite 300
Long Beach, CA 90804

The Videodisc Monitor
Future Systems, Inc.
PO Box 26
Falls Church, VA 22046

Whitney Educational Services
1777 Borel Place
Suite 416
San Mateo, CA 94402

Allen Communications
140 Lakeside Plaza II
5225 Wiley Post Way
Salt Lake City, UT 84116

Visual Database Systems
614 Bean Creek Road
Scott's Valley, CA 95066

Video Vision Associates, Ltd.
7 Waverly Place
Madison, NJ 07940

VIVA: Video Interfaced Visual Authoring from Knowledgeware

By Guy Wright

The VIVA system interfaces the Amiga with video technology, creating a medium for communications, artistic expression and a host of other applications.



Interactive video—the term is intriguing. Images of interrupting Carson with questions of your own, or calling the plays when the quarterback isn't doing a good job, or warning the detective that a thug is waiting behind the door. To a degree, this is already possible. There are television programs that ask viewers to "vote" by placing a call to a 900 number, call-in talk shows and one or two cable television companies that offer instant polling features with a computer-like input device that feeds information back to the company over the same cable that brings the programs to the home. But these are only nominally interactive and are completely controlled by the network or cable station.

The first interactive video projects were done in the universities. One project displayed video images of every street in Aspen, Colorado, heading in both directions. The computer was then used to search and play the scenes in any order that the user desired, creating a visual map of the town. The user could "ride" through town, turning down various streets, and the computer would pull up the appropriate scenes.

The next wave of interactive video came with the game Dragon's Lair. It was an arcade game that used cartoon animation scenes stored on a laser disc; the interactive input was through the movement of a joystick. The player could direct the hero through numer-

ous hazards and cartoon battles. If the joystick was pushed to the left at the correct moment, then the computer (a dedicated board within the machine) would display the appropriate animated sequence where the hero would jump to the left.

Other forms of interactive video have surfaced in airports and hotels around the country. The traveler is shown different points of interest around the city, based on input from an abbreviated keyboard. Interactive video has also been used, to a limited degree, in training, demonstrations and presentations. The simplest definition is random access video, where any kind of video information is displayed based on input from the user. That input can be a joystick, touch pad, keyboard or whatever, and the resulting video can be based on a straightforward request from the user (e.g., "show me scene number 543" or "show me part number 62554"), or the video output can be organized so that it is presented in a set pattern tied to responses from the user (e.g., "guess the next picture and display it" or "show me the video sequences about lunar landings").

The Amiga computer can handle the processing of input and determine what scenes should be displayed. Laser-disc players are fast enough so that any given frame or sequence on a disk can be located quickly. Companies, institutions and schools are producing laser discs filled with information.

On the computer side of interactive video, there have been interactive fiction games and simulations, but the majority of these have been text only, or at best have made use of crude computer graphics. The closest to real interactive programs have been the arcade games, but they also lack the clarity of true video.

Back to the subject of laser-disc players. True video image storage exists, the ability to connect with an Amiga computer exists, but there is still a missing element. Laser discs by themselves are only marginally interactive. You can turn them on and off, freeze frame, slow motion, search and even play the images backwards, but there isn't much decision making going on.

There are other important problems with interactive video that are being tackled by various companies, such as read/write laser discs, production costs, mixing data, video and audio, standards, interfacing, marketing, etc. But perhaps the most important aspect of interactive video, once the hardware problems have been circumvented, is the creation of the programs that would allow a user to interact with their laser disc. Knowledgeware, a California-based company, will be releasing a program that helps people write interactive programs for use in homes, schools, offices, factories and other environments.

VIVA (Video Interfaced Visual Authoring) for the Amiga computer supplies the basic framework for an interactive video program. The program can be used to provide easy access to audio-visual information stored on laser disc. It links the laser-disc player's video and audio capabilities with the Amiga's interactive capabilities to create new tools for education, business presentations, training, entertainment, artistic expression, information retrieval, sales, exibits, demonstrations, lectures and more.

The VIVA authoring program consists of three major sections: Remote Control, Creation and Player. The ►

Remote Control section allows the user to run all the standard videodisc player features from the keyboard or with the mouse (e.g., searching the laser disc for particular sequences, finding individual frame numbers, etc.).

The Player section plays the program back as it is being written and when it is finished and includes features such as: random access to any step in the program, automatic or manual play, computer text or graphics with sound from the videodisc and writing to the screen using the computer as a blackboard.

The Creation section is the heart of VIVA. It is simple and straightforward, designed for the non-programmer. On-screen help and defaults aid in the creation of the program. All that is required of the programmer is the input of essential information, either using the mouse or single keystroke commands. The program is created in steps (programs of up to several hundred steps can be stored in memory) containing videodisc instructions, computer-generated text pages, graphics, menus or key-word questions. Multiple videodisc instructions may be combined into a single string instruction. VIVA has a built-in line parser that lets you specify which key words are important in a user response. This means that if you ask a question such as "What is the common element in each of the previous three sequences?", the program can be made to search for up to 24 different key words, plus a default, no matter where they fall in the response. "Each picture was blue", "They were all blue" and "Blue was the common element" would all be acceptable responses for that particular program step. The programmer can change the key words in each step.

There is a built-in word processor for creating text, menus, questions, etc., and there is a printer program for printing the program.

There are other programming and playback features of the VIVA authoring system, but its primary feature is ease of use. Programs can be created and/or edited quickly and easily. VIVA will work with any Amiga (the videodisc player interface is included), any color monitor and with either a Pioneer LD–700, LD–V4000 or Magnavox VC–8040.

Interactive video is of particular value to any person, school or organization whose operation could be enhanced with audio-visual information access and organization. A laser disc can hold up to 108,000 still-color images (television broadcast-quality images) as well as motion sequenced images with high-fidelity stereo sound. VIVA offers a way to integrate the information stored on laser disc with the interactive computing capabilities of the Amiga. ■

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2377 Monterey Rd.
Atascadero, CA 93422
805/466-3639

Success Story: A-Squared Systems And the Amiga Digitizer

By Matthew Leeds



This is the story of an American Dream—taking a great idea, lots of hard work, turning it into a successful product, and along the way meeting interesting people and having adventures. This theme runs deep in our subconcious, surfacing in last summer's movies about teenage geniuses. However, some elements that are missing in many of these wish-fulfillment fantasies are the hard work, attention to details and just plain stubborn belief that not only is it possible, but you are just the one to make it happen. Thomas Edison said that genius is 1% inspiration and 99% perspiration. This is a story about sweat.

A-Squared Systems has developed a real-time video digitizer, called Live!, for the Amiga. I spent a day with the three people who are A-Squared Systems. They live and work out of a house in the hills of Oakland, California. I drove up a wooded canyon, past deer crossing signs and A-frame houses until I reached a house perched on the side of a hill, with a view of the canyon below. Posted on the front door of the house was a picture of our galaxy, titled Traveler's Advisory, with an arrow pointing to one spiral arm labeled "YOU ARE HERE." I had arrived.

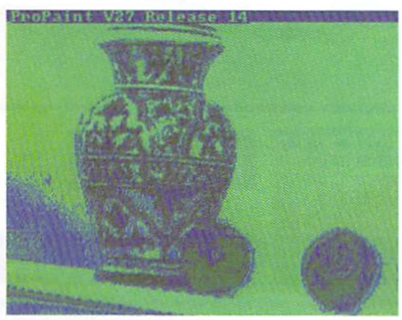
I was greeted by Wendy Peterson. She is a petite, dark-haired woman with an ever-present twinkle of amusement in her eye and voice. She is the public persona of A-Squared. From public relations to business deals to contract negotiations, Wendy is the glue that keeps the organization together.

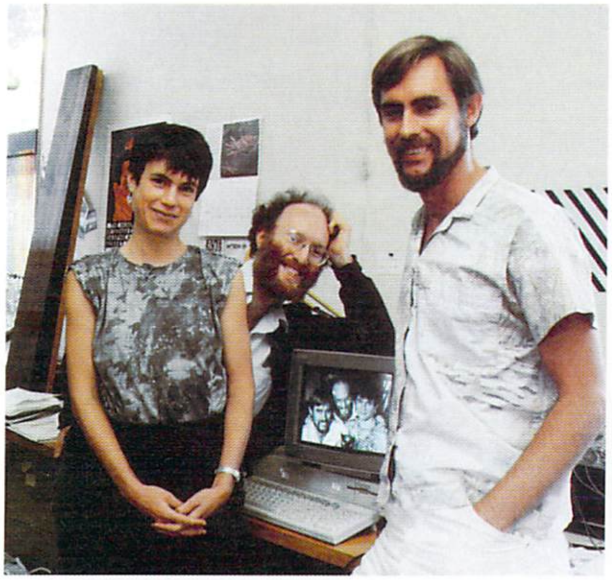
Arthur Abraham is the programmer for A-Squared. He reminds one of an absent-minded math professor, always looking slightly misplaced.

George Ellis is the hardware designer. George gives you the impression that he could build a television set from scratch and it would work the first time.

Wendy and Arthur met several years ago when they were both working for Sierra On-Line. Arthur was doing some programming for a game called King's Quest, a 3-D animated adventure game. He had developed a studio environment for the production of software that could have revolutionized the software production process, analogous to the way in which the assembly line changed the nature of automobile production. Wendy had worked for several smaller software companies before going to Sierra On-Line; when she arrived, she saw the utility of Arthur's ideas. However, management didn't see things their way, and frustration forced Wendy and Arthur to leave. They moved to the Bay area, hoping to start their own production company and to implement some of Arthur's ideas. They intended to produce new and better software tools for program production.







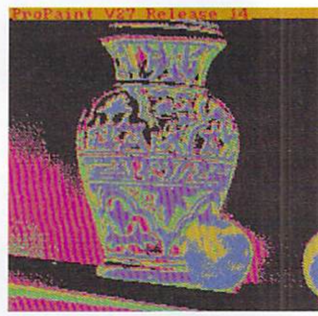
Left to right: Wendy Peterson, Arthur Abraham and George Ellis. Opposite and following pages: illustrations were generated using A-Squared's Live! digitizer for the Amiga.

The San Francisco Bay area is a hotbed of software production and publishing, and it seemed to be the perfect place to find funding for their concept. However, the industry was beginning to backpedal. Sales were slowing down, the video-game business had fallen off drastically and no one was willing to spend money on new tools. They began to take contract programming work in hopes of financing their own operation.

Wendy and Arthur were still looking for funding for some of their own projects when they approached General Electric Systems Inc. (GESI), a video production/research/design/distribution operation. George Ellis was working for GESI at the time. Although Wendy and Arthur never got financing from GESI, they became friends with George. George has degrees in both physics and art. He designed and built his own video paint system, built editors for several video production companies, worked with laser graphics, special effects video equipment and gen-lock systems. They began to see areas of common interest and became interested in working together.

Birth of an Idea

In September '84, they were introduced by a friend to R.J. Mical, Director of Intuition at Commodore-Amiga. They were seeking funding to develop a game called Paradise, a magical simulation of a planet that you create. (Look for it in the future.) In the process of discussions about the Amiga, Arthur gained some insight into the operation of the machine. In November, he attended a conference in San Francisco and saw MacVision, a video digitizer for the Macintosh. Arthur had always wanted a digitizer, and when he saw the insides of MacVision and how few components were involved, he decided it might be possible to design one slightly more complex and get color in real time on the Amiga.



Arthur then began to work on the mathematics of designing a digitizer for the Amiga. He decided that, in theory, it was possible to build the hardware. George and Arthur began to design the hardware, and in December, they approached Commodore-Amiga with a proposal for a real-time video digitizer. Engineers at Amiga had decided that the cost of a digitizer would be too high and had put efforts to design one on the back burners. They talked with Dave Needle, one of Commodore-Amiga's chief engineers, and Don Reisinger, Vice-President of West Coast Sales at Commodore-Amiga, and were given a development system on the basis of their proposal and the list of potential applications it contained. This showed great faith on the part of Commodore-Amiga, since A-Squared had no track record in ►

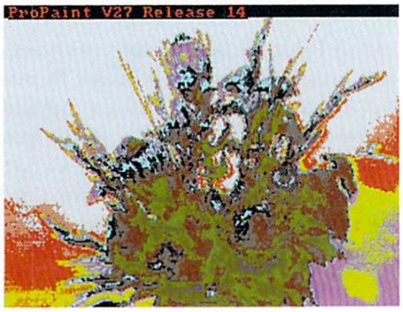


computer hardware design, and at the time was just a start-up "garage" operation. By January '85, A-Squared was committed to developing the Amiga digitizer, regardless of where the funding came from. They were certain that the project would be a success.

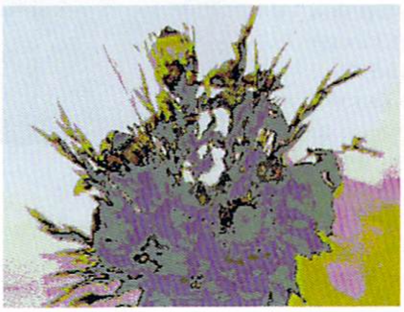
Initial Response

In April, Wendy, Arthur and George went down to Sunnyvale to demonstrate the digitizer for the first time at Commodore-Amiga. They set up in a conference room near the center of the building. The excitement was contagious. Programmers and engineers were trying to edge each other aside to get a better view of the Amiga being used in a way they had never seen before. This was the first time A-Squared had shown their work to anyone, and the first feedback they had received after months of work.





After that first demonstration, Clive Smith, Vice-President of Planning and Development at Commodore International, decided to adopt the digitizer as *his* project. He instructed Rick Geiger, General Manager of Commodore-Amiga, to put the digitizer on the "fast track." This gave A-Squared practically unlimited access to equipment, software support and the all-important option agreement (contract/money) with Commodore-Amiga.





The Home Stretch

During the rest of April and most of May, the work focused on adding color capabilities to the software and hardware. A developer's conference was held in Monterey at the end of May; still secret at this time, A-Squared could only show the digitizer to a small number of developers. However, rumors were being passed around like hors d'oeuvres.



The second version of the hardware prototype needed to be finished before the July launch of the Amiga in New York. The new version would have true color digitizing capability, not just gray scales. Many long hours were spent on the phone, in meetings and in the lab, trying to iron out all the little bugs that cropped up. All the effort, hard work and sweat paid off at the launch when over 2,000 people were shown the Amiga Live! digitizer in full color. Andy Warhol digitized an image of Deborah Harry, sketched in a few details and displayed it on the three large video projection screens on stage.

Fine Tuning

When I visited A-Squared, they had just finished adding a hardware enhancement that allowed for 16 levels of gray, supporting a 32-color real-time display. The hardware was still in prototype, and it required some fine tuning and more than one thump on the side to coax a reluctant solder joint to function. We hooked up all the hardware, attached a video camera to the digitizer, and I saw myself on the monitor, digitized in 16 levels of gray. It was uncanny. I'd seen other digitizers at work; they required you to hold still while they completed a scan, several seconds at a time. But this was instantaneous, continuous, real-time digitizing. It was like watching a movie, with myself the star, all the while knowing that I could use the mouse to freeze the picture, store it to disk or dump it to the printer.

Arthur quickly ran through a series of software "tricks" to show me some of the potential uses of the digitizer. By assigning different values to the color registers used in creating the image (see p. 30), he was able to produce false color images that would be useful in cartography, medical photography or image analysis. Dropping all but one bit plane gave us a high-contrast black-and-white image that would be useful for digitizing line art or type faces. Storing an image and then masking out different bit planes created a posterized effect. Using a smoothing technique increased the apparent resolution in a still shot of a soft drink can. The quality of the image was astounding.

All this was done with the first prototype that they had built. We shifted over to the second prototype, with the color hardware built in (this is what the production version will be like) and hooked up a VCR to the input port. A video cartridge of a current movie was inserted, and we watched John Leone portray an ice age savage revived in the 20th century. I was beginning to feel the same way. The color and resolution approached that of standard broadcast TV.







►

How the Amiga Creates a Display

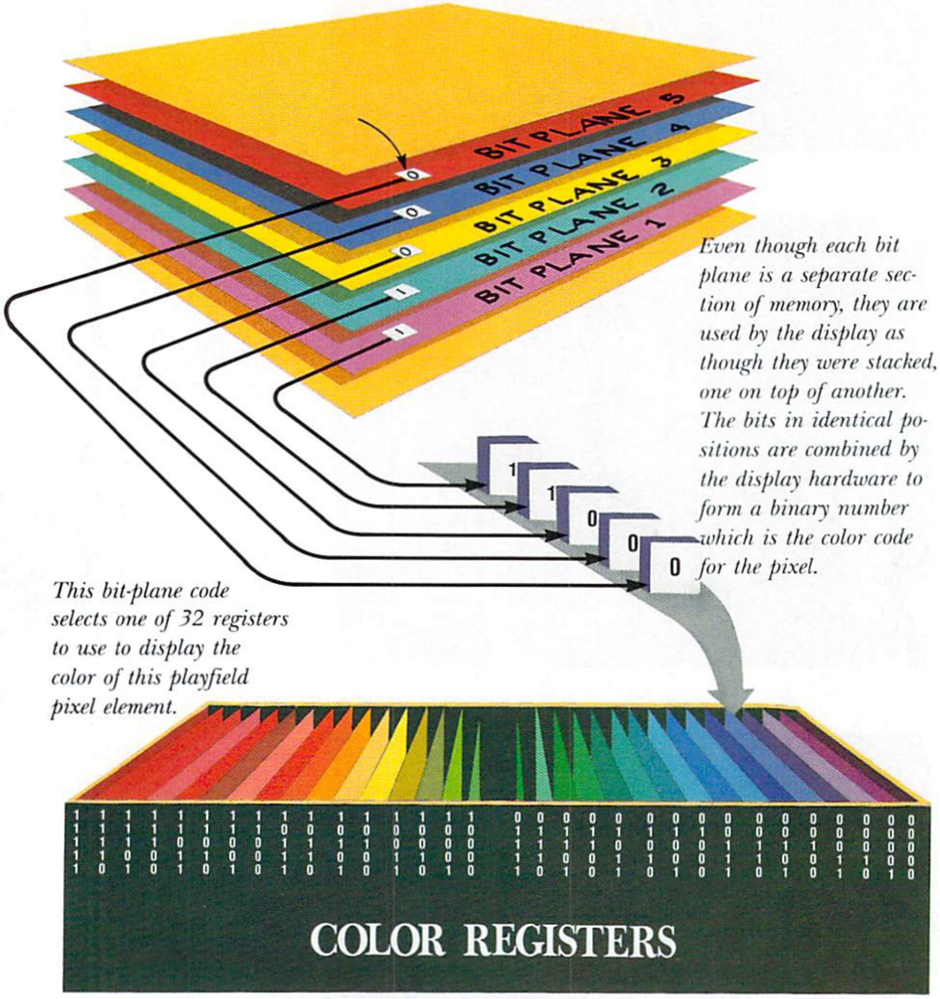


Fig. 1. How bit planes select a color.

Pixels, bit planes and color registers. . .the Amiga sees the world a little differently than you or I. When you look at the screen, you see a complete picture. The Amiga sees an image broken up into a 320 × 200 grid, the normal low-res mode. Each part of that grid is a *pixel*, or picture element. Think of them as switches for a moment, either on or off. If they are on, that pixel is white; if they are off, that pixel is black. This grid, with information on what color each pixel is and where it is in the grid, is called a *bit plane*. Notice that we can only have two colors in this bit plane, since each "switch," or bit, can only be on or off.

To display more colors on the screen, we need to have more bits. This is accomplished by using more than one bit plane. Each bit plane is in a separate part of memory. Think of them as stacked, one on top of the next. You could draw a line connecting bits from each plane. This set of bits is used to select the color for one pixel in the display. By combining the values of each set of bits we can use more colors.

Imagine two switches, either on or off. There are four possible combinations for two switches: on and on, on and off, off and on and off and off. This allows us to show four colors. The more bits we use, the more colors we can display. Each grid of bits is a separate bit plane. Five bit planes will give us 32 colors, the maximum the Amiga can display in normal low-res mode.

The binary value of each bit is used to create a binary number. This number is linked to a table called the *color registers*. Since the Amiga has a palette of 4,096 colors and can only display 32 of them in normal low-res mode, we need a way of selecting which 32 we will use at any one time. The color register table stores a list of which colors are being used, and by changing the color stored in any register, we can change the color of all the pixels on the screen using that register. This allows for a great deal of control in displaying colors. By changing the value of one bit in one plane, you can change the color of a single pixel without changing anything else.■

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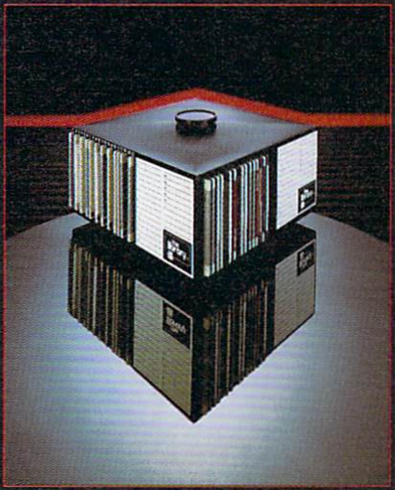


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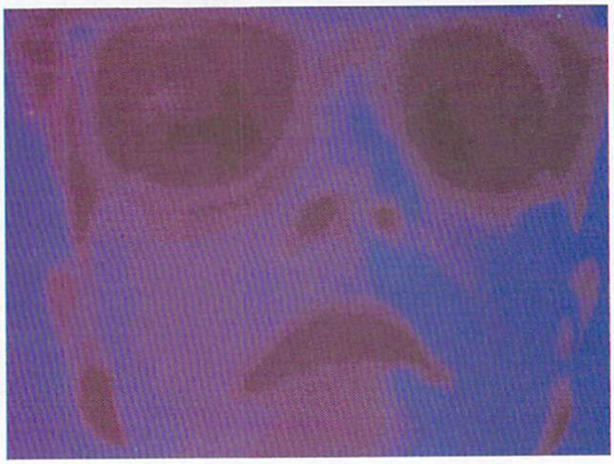
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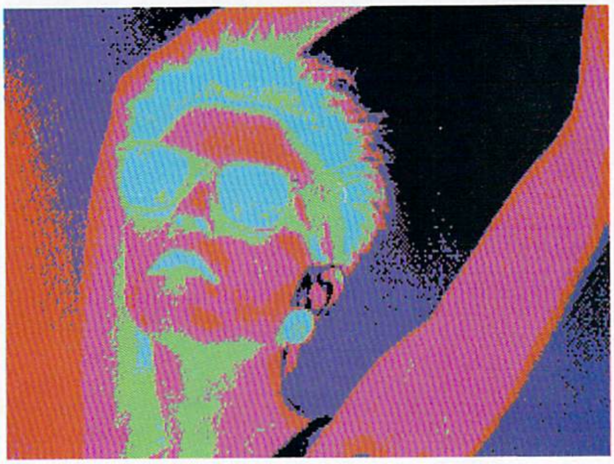
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◄ Arthur explained that there are several significant advantages to the digitizer. One is cost. There are no other real-time color digitizers available for under $500 on any system. The second advantage is that it can accept video from any source. Many other digitizers require either a gen-lock or time-base correcter to accept signals from a home VCR. Another advantage is the accessibility of the digitizer for programmers. A-Squared will include complete programming information in the manual and on disk for developing custom applications using the digitizer. Examples in every language available for the Amiga will be included.

The key here is open structure. Commodore-Amiga has been working with developers to create a standard file structure for graphics on the Amiga. This will allow image files created with one program to be used by another. The standard needs to be open-ended, to allow for future expansion of information contained in graphic data files. Several applications are already under development using this standard. Broderbund is creating a version of Print Shop that will use the Amiga digitizer as an additional source of graphics. Arktronics is developing a word processor that can merge graphics files into text printouts.

George talked about the digitizer's hardware capabilities. One possible application would be stereo imaging with two digitizers. By using two video cameras, offset by just a few inches, you could achieve a 3-D effect. Larger offsets could be used in cartography or geophysics.

One project A-Squared would like to see involves using the Amiga, a digitizer and an infrared camera in sports medicine clinics. Injured tissue gets hotter than its surroundings, and this could be diagnosed using thermal photography. Current systems are expensive, and many small clinics cannot afford them. The Amiga will bring this technology within the reach of just about any sports clinic or health club.

Big Dreams

The future looks bright for A-Squared Systems. They plan to develop several vertical market applications for the Amiga using their digitizer. They are also thinking about designing other video hardware peripherals. Big plans are in the making, some of them nothing but dreams. That's what it takes to get started in this business.■

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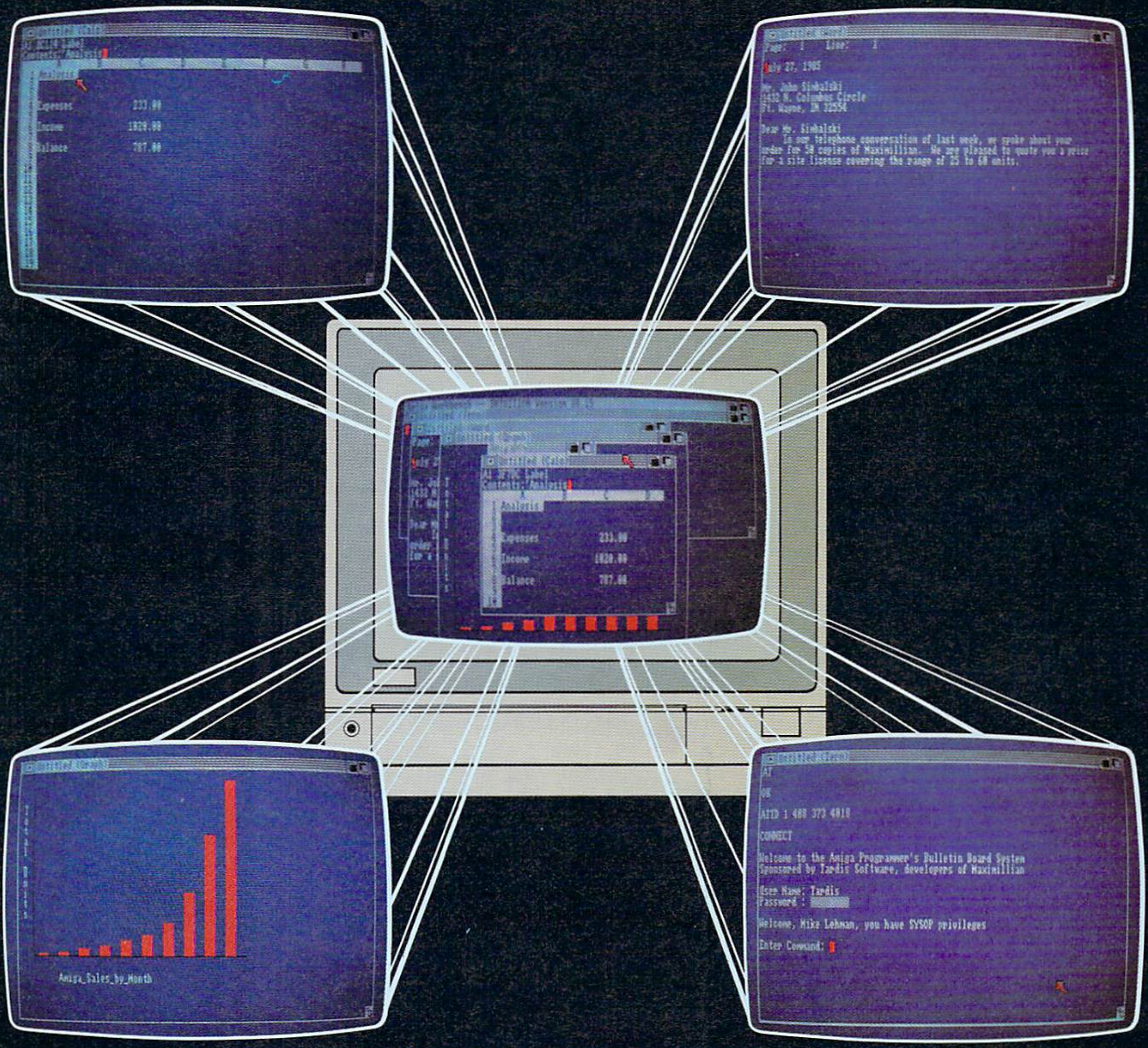
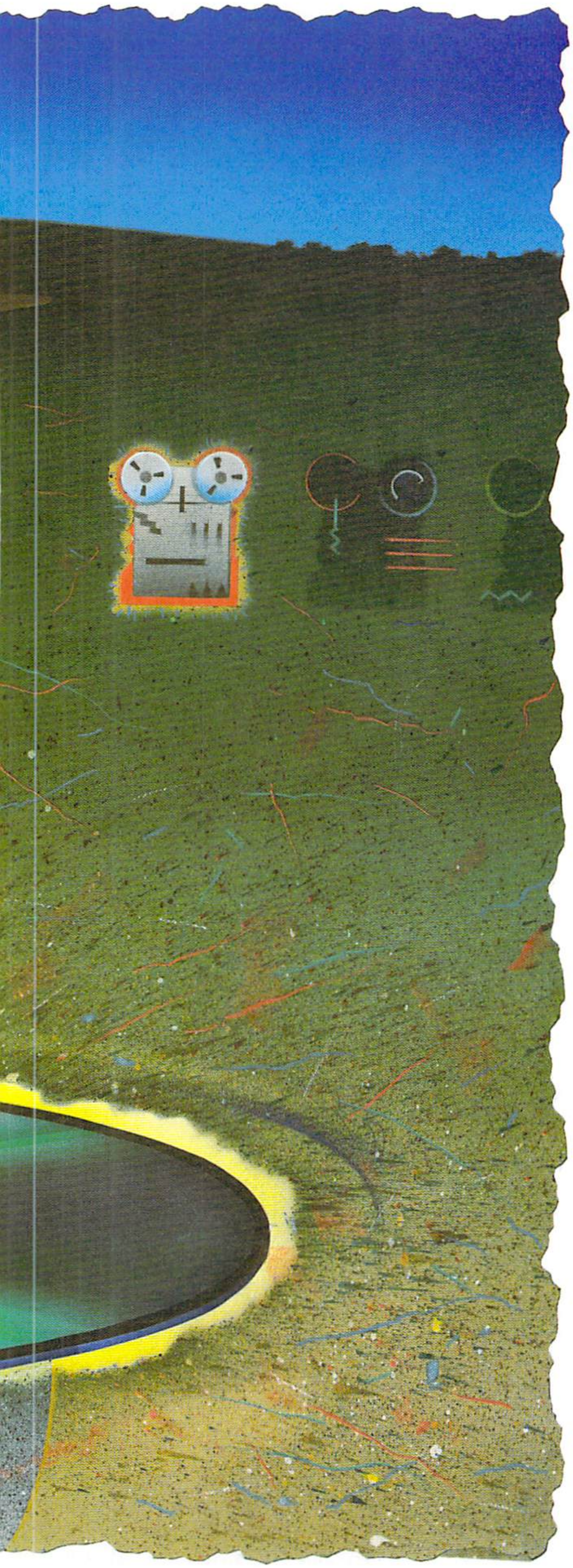




Illustration by Steven Lyons



Optical Revolution

By Matthew Leeds

A revolution is taking place in the world of information storage. The ways in which we store and retrieve, distribute and duplicate information are changing and evolving. CD-ROM and optical read/write technology have arrived, sooner than anyone expected, and at a cost that many of us can afford.

The recent developments in information-storage technology have their beginnings in the introduction of commercial videodisks. Derived from work in the early '60s by 3M Corporation and brought to market by MCA, Phillips and Pioneer, commercial laser-disk players became available in quantity in the '70s. They were first used in industrial training applications and soon made their way into consumer channels as an alternative to video tape players. They never became as popular as videotape, since no consumer units capable of recording are available yet. They have, however, caught on in a big way as CD audio. These compact disk units offer excellent quality stereo sound reproduction, ease of use, acceptable cost, and will soon offer still-frame visuals. In at least this application, lack of recording capability is not missed.

A new concept is the CD-ROM. This uses technology similar to that of the CD audio disk and stores information that can be read by a computer. Software programs, books, encyclopedias, dictionaries, almanacs and atlases are some of the candidates for storage on CD-ROMs.

The Basic Technology

All read-only laser disks, whether large videodisks or audio compact disks, use the same technology. An aluminum platter is coated with a plastic layer (called the optical recording layer) and then stamped by a master platter, similar to the way a record is made. This layer is where the information is stored in a series of pits. The size of each pit and the distance between them is the coding technique. The stamped platter is then coated with an optically clear plastic, called a scuff coat. To read or play back the information, a very low-powered laser beam is sent through a series of mirrors, prisms and lenses through the scuff coat to the recording layer. Each time the beam encounters a pit, its polarity is changed. The beam is reflected and sent back along with part of the original beam to a special ►

prism, known as a Wollaston prism, and then sent to a photosensor. The photosensor converts the laser beam to an electrical signal that can be decoded.

There are several technical considerations. The disk must be kept centered, or the beam will wander over the surface of the disk. Since it is not possible to keep the disk perfectly flat, the laser must have a focusing servo mechanism to follow the up and down movements of the disk as it rotates. The drive mechanism that spins the disk must maintain an accurate rate of speed. Dust and dirt must be kept from entering and becoming trapped in the scuff coat. (A dust particle is much larger than a single track on the disk, and can cause dropouts of information.)

CD-ROMs have several advantages over other methods of storage; the storage media is very durable and the drives are very stable.

There is more to think about. Early laser-disk players used tube (helium-neon gas) lasers and top-loading systems that were prone to dust collection. Current players use a front-loading system and solid state diode lasers. These diode lasers give better than 60dB signal-to-noise ratios. This eliminates all bit-read errors except those caused by defects in the optical-recording layer. It is possible to design a scuff coat that is thick enough to keep all surface dust far enough away from the recording media to be out of the focal plane of the laser beam, and still thin enough not to distort the beam. The raw bit error rate (BER) on laser-disk players is around 10 to the −5th or −6th. Using redundant bits and error checking, that rate can be brought to 10 to the −13th. Floppy disks have a corrected BER of 10 to the −9th. Hitachi has published information on a new chip that will increase the BER to 10 to the −20th.

Cost is also an important consideration. There are no significant differences between an audio CD player and a CD-ROM drive. In fact, it should be cheaper to make a CD-ROM drive since there is no need for a digital-to-analog converter or stereo channel equipment. CD-ROM drives will be like floppy disk drives; the bare drive will require a controller card. It should also be possible to manufacture a drive that could function as both a CD-ROM reader and a CD audio player. Since CD audio technology is well understood, several manufacturers exist as sources for both raw disks and as stamping plants for data disks. There is no need for a start-up operation to risk millions in developing a new technology from the ground up. The cost of a blank disk to a manufacturer will be between $1 and $2, until volumes get into the millions, and then they will fall below $1. Mastering costs are below $10. Drives will start in the $1200 range, and quickly drop below $500. There will be a strong incentive to subsidize the cost of drives to encourage consumers to purchase them. Given the planned retail pricing on CD-ROM data disks, it seems obvious that the profits will be made on software, not on drives.

CD-ROMs have several advantages over other methods of storage. The storage media is very durable. Magnetic fields will not accidently erase data, nor will accidental formatting, since you cannot write to it. The drives are very stable; unlike hard disk drives, they are not sensitive to vibration or rough handling. There is no need to "park" the head during transport. Think of the portable CD audio players and you'll see what I mean. The storage capacity is in excess of 500 Mb. That's a lot of data.

Uses

The first software produced in CD-ROM format was the Academic American Encyclopedia from Grolier Electronic Publishing. This includes the entire contents of the 21-volume set, over nine million words. The disk will retail for $199, a considerble savings over the $600+ cost for the printed and bound version. There are other advantages. The disk also contains a fully cross-referenced index to every unique word in the encyclopedia. This index was created by Activenture, Inc., founded by Gary Kildall (inventor of CP/M). Activenture located every unique word in the encyclopedia, which was compiled on a VAX minicomputer, and indexed its location. This index was then sorted alphabetically by word and location. The final result was a 60 Mb index for a 58 Mb encyclopedia and the ability to do incredible searches.

The search capabilities allow for remarkable depth in research. Asking for information on Halley's Comet will bring references to astronomy, the Norman Conquest, religion and art. The software allows you to browse through articles—a page, a line or a paragraph at a time. Searches by title, key words, combinations of words or bibliography are also possible. All of this information occupies less than 25% of the disk. Grolier plans to add a dictionary, atlas and thesaurus. Other plans include graphics and applications software, such as a word processor, database and spelling checker. Frank J. Farrell, group VP for Grolier's U.S. Reference Group, says, "We are out in front of the parade on this."

Consider a book, let's say a cookbook, stored on a CD-ROM. Naturally you could search for your favorite recipe, and of course, there would be color pictures of what each dish looks like when it is prepared, along with suggested side dishes. But imagine also a full tutorial on how to prepare each dish, with short action sequences by famous chefs on how to correctly cut the vegetables, what kind of skillet to use and what it should look like when done. The ingredients database

could let you enter what leftovers you have on hand, and then hunt for a suitable meal that incorporates them all.

Distribution of information in this form leads to concerns about copyright laws. Although it would be difficult to duplicate a CD-ROM disk, software contained on it could be downloaded and duplicated. Other concerns over the duplication of information contained in the encyclopedia may worry some people, but for the most part, the only difference between photocopying a printed encyclopedia and downloading text from a CD-ROM is the ease with which it can be done.

The Library Corporation of Washington, D.C. offers BiblioFile, a service that periodically updates the Library of Congress English holdings catalog in two CD-ROM disks containing all interfiled changes. This information used to be supplied on microfiche film and took several file drawers to hold. They also supply Hitachi drives that are plug compatible with IBM PCs.

Gary Kildall has suggested selling a single disk that would contain thousands of CP/M programs. Since CP/M has been in use for many years, and since it runs on dozens of machines produced by different manufacturers, it may be an excellent means of distributing the large existing public domain library of software. A good cross reference, accurate documentation and debugging would insure interest in such a product.

Several other companies have suggesed building a computer with a single floppy drive and a built-in CD-ROM drive. This drive would not be accessible to the user, but would contain operating system software, applications software, a dictionary, an encylopedia, maps, a thesaurus and other useful information, such as a system tutorial. You could think of it as a replacement for the ROM chips found in all computers. Several operating systems could be stored on a single disk, allowing the end-user to select between Unix, MS-DOS, AmigaDOS, CP/M and other operating systems. The falling cost of RAM, coupled with the storage capacity of CD-ROM, could bring about the creation of the "appliance computer," as easy to use as a toaster or a TV set.

Other potential uses for CD-ROM text storage would include: law libraries, corporate documentation, policies and procedures manuals, medical texts and parts catalogs. To get a good perspective on the capacity of one CD-ROM, imagine a stack of floppy disks over 12 feet high, or twenty-five 20 Mb hard drives stacked on top of each other. Any way you look at it, it's a lot of information.

Sony has announced the CDU-1 drive, with the ability to access 150K of information per second. Retail price is around $1900. Reference Technology, Inc. is marketing a CD-ROM drive with an interface for the IBM PC for about $1600. Several other computer companies are in the process of developing either dedicated CD-ROM drives or interfaces. Hitachi, Phillips, Pioneer and Denon are all working on drives for the consumer marketplace. By the end of this year, we will see widespread use and acceptance of CD-ROMs.

One hitch in the spread of CD-ROMs is the current lack of standards for interfacing the drives to a computer. Although it would be possible to use a high-speed RS-232 port, the current trend to DMA data transfers suggests that a new hardware standard would be beneficial. One suggested standard is based on the SASI interface used for hard disks. Known as the Small Computer Systems Interface (SCSI), it has yet to be adopted as an industry-wide standard.

Optical Read/Write Capability

The one thing missing from CD-ROMs is the ability to write to disk and erase/rewrite to disk. Imagine that same computer of the future, with all that information built-in, and room for an additional 500 Mb or so. All in one box—no add-ons, loose wires or interface problems. You may be able to buy one sooner than you think.

By the end of this year, we will see widespread use and acceptance of CD-ROMs.

The main features of an erasable optical disk are reusability, large data capacity, good random access capability and removable/replaceable storage media. The basic concept is a laser disk with a recording layer that is sensitive to a moderately-powered laser write/erase beam, but not affected by the subsequent read beam, even over successive reads. The read beam may be either a lower-powered laser or one of a different wave length. One area still to be proven is the archival quality of the recording. There is some concern over long-term stability in write/erasable laser disks.

Write-once optical disks have already arrived and have been in use for three years in video production. The system most commonly used is the Optical Memory Disc Recorder (OMDR) by Panasonic. This is a video recorder, capable of storing 24,000 frames of any NTSC video source, in still frame or motion. However, it has no data-recording capability. ►

◄ There are two names for this kind of write-only disk: Direct Read After Write (DRAW) and Write Once Read Many times (WORM). They work by altering the recordable laser disk, either by vaporizing or deforming the disk surface, or by changing the chemical state of the disk surface. In a DRAW system, the data is written to a buffer in memory as it is also written to the disk. A second laser reads the information off the disk directly after it has been recorded. It is then compared to the data in the buffer. If it is identical, that block is considered valid; if not, the block is marked invalid and rewritten. The WORM system works in a similar way, but instead of using a second laser, the reflected write laser beam is read (DRDW, or Direct Read During Write).

The Optical Memory Disk Recorder uses an eight-inch disk coated with a film of tellurium suboxide, a component of blasting caps. The coating is applied to a polymer base that has been stamped with 24,000 grooves in a continous spiral. The tellurium is sandwiched between two coats of acrylic. A 12mW diode laser vaporizes the heat-sensitive tellurium coating, leaving a dot with a different reflectivity than the surrounding surface. This dot can be read at a much lower power level by the same diode laser. The length of each dot, and the spacing between dots, contains the frequency-modulated pulses that are the video information.

Another technology for write-once is phase change. The disk is coated with a substance that can change its chemical state from crystalline to amorphous. This change of state also changes the reflectivity of the disk surface. Data is also stored as a series of dots on the surface. There have been some recent developments in the use of phase-change materials that allow for erasable storage. Energy Conversion Devices and Hitachi have announced reversible phase-change media. Recorders that use these new disks have yet to be developed. There have also been doubts expressed over the long-term stability of phase-change media. Some experimental data points to reversal of phase during storage, leading to loss of data. This may be resolved in the future through the use of new materials.

Currently the best hope for erasable optical media lies in a process called magneto-optical recording. This synthesis of magnetic and optical sciences is based on two well-understood effects: The Curie effect and the Faraday effect. When a magnetic material is raised to a specific temperature, known as the Curie point, and then exposed to a magnetic field, the material becomes magnetized. The Faraday effect involves the polarization of light reflected from a magnetized surface. Although slight, it can be detected and used as a data record.

An important consideration in the use of magneto-optical recording is that the size of the recording head is not critical. Since the only material affected by the head is that which has been heated to its Curie point, the size of the spot can be controlled by the diameter of the laser, and not by the size of the magnetic recording head. It is easier to focus a laser beam to a small diameter than to manufacture a small recording head. This reduces the production costs for an erasable drive.

What's Available Now?

There are several write-once optical storage data drives available now, and they are all very expensive. Alcatel Thomson Gigadisc and the Optimem 1000 offer 1 gigabyte of storage and use the SCSI interface. They are priced in the $15,000 range. Hitachi, NEC and Fujitsu have also introduced drives, with prices in the $7,000 to $11,000 range. If you are looking for a less pricey entry into this arena, Optotech, Inc. is offering a WORM-technology cartridge drive for $5,000. (This is the single-unit cost; the price drops for volume purchases.) Each double-sided cartridge can store 200 Mb on a side. They currently offer an interface for the IBM, and are developing one based on the SCSI standard. The cartridge cost will be below $50. That's for 400 Mb of removable information storage.

What do you do with all that storage? If you are a banker, you keep an audit trail for the year on one disk, and you can maintain data security by locking the disk in the vault each night. Hospitals can keep medical records, X rays and charts on-line (optical drives can store visual information; they have for years). If you are planning a computerized educational program, the ability to mix text, video-based visuals and graphics, plus the ability to store 400 Mb on a single cartridge, comes as a blessing.

There is also a significant cost savings in storing information on optical disk instead of filing it away in paper form. The average company uses 20% of its office space for storage of company records. Consider the cost of square footage in the business district in your city, and you can calculate how much you could save doing away with the file cabinets and storage bins.

Sales of optical disk drives are expected to be over seven billion dollars by 1990, according to a study by Freedman Associates. A properly-designed erasable drive will still be able to read CD-ROMs, and is immune to the head crashes that plague hard-disk drives. Cartridges are small enough to fit in a coat pocket or be mailed across the country.

In 1985, Verbatim, owned by Kodak, demonstrated a prototype 3.5-inch erasable disk and drive. The disk was a pre-grooved combination of thermal writing and magneto-optical reading technology. Its current data storage capabilities are only 40 Mb, but the company projects storage of up to 100 Mb by the official introduction scheduled for 1987. The target pricing is between $500 and $1000 for the drives, and around $30 for the disks. Kodak is a big company, and may become the leader in this field.

Time was when computers had less then 64K of RAM, and used cassettes to store data. We never dreamed of needing more than 640K of memory, and never demanded more than a 10 Mb hard disk. Time marches on, and so does technology.■

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- 3½" SS/DD — $29.99
- 3½" DS/DD — $39.99
- 5¼" MD-2 DS/DD — $24.99

ELEPHANT
- 3½" SS/DD Disks (10) — $29.99

AMARAY
- 30 Disk Tub 3½" — $8.99

• PRINTERS •

EPSON
- RX-100, LX-80 — CALL
- FX-85, FX-185 — CALL
- LQ800, LQ1000 — CALL
- LQ1500, JX80 Color — CALL
- Homewriter 10, HS-80 — CALL
- LX-90, SQ-2000 — CALL
- DX-20, DX-35 — CALL

JUKI
- 5510 Dot Matrix — CALL
- 6000 Letter Quality — CALL
- 6100 Letter Quality — CALL
- 6200 Letter Quality — CALL
- 6300 Letter Quality — CALL

OKIDATA
- 84, 93, 182, 192, 193 — CALL

PANASONIC
- KX1091 — $259.00
- KX1092 — $389.00
- KX1093 — $479.00

TOSHIBA
- 1340 (80 column) — $469.00
- P341 (132 column) — $999.00
- P351 (132 column) — $1169.00

• PLOTTERS •
- **HEWLETT PACKARD** — CALL
- **EPSON** - HI80 — CALL
- **ENTER** Six Shooter — $799.00

• ACCESSORIES •

KENSINGTON MICROWARE
- Master Piece — $99.99
- Printer Stand — $19.99

CURTIS
- Diamond SP-1 — $32.99
- Emerald SP-2 — $42.99
- Sapphire SPF-1 — $52.99
- Ruby SPF-2 — $62.99
- Tilt Base Monitor Stand — $34.99
- Safe Strip — $19.99

CABLES
- Parallel Printer Cable — $19.99
- RGB Monitor Cable — $19.99

• MODEMS •

TECMAR
- T-Modem 2400 — $569.00

ANCHOR
- Volksmodem 300/1200 — $199.00
- Signalman Express — $259.00
- Lightning 2400 Baud — $399.00

HAYES
- Smartmodem 300 — $139.00
- Smartmodem 1200 — $389.00
- Smartmodem 2400 — $599.00

NOVATION
- J-Cat — $99.99
- Novation 2400 — $589.00

•MULTIFUNCTION MODULES•

TECMAR
- T-Card — $849.00

THIRD PARTY SOFTWARE

The following is a partial listing of software being developed with plans to be marketed by third party software vendors. Please call for pricing and expected deliveries.

CREATIVE SOFTWARE
Creative Writer, Creative Calc, Creative Filer, Creative Finance, Roll Call USA, Personal Musician, Air Defense, Trolls & Tribulations, Break Street, Maze, The Pando Wars, Warp, Torpedo Junction, Conquest of India

THORN EMI
Perfect Writer, Perfect Calc, Perfect Filer, Perfect Link

THE SOFTWARE GROUP
Enable

HAYDEN
Ensemble, Sound Vision, Sargon III

ELECTRONIC ARTS
One-on-One, Archon, Adept, Seven Cities of Gold, Sky Fox, Marble Madness, Return to Atlantis, Video Construction Set

AEGIS DEVELOPMENT
Amiga Draw

ARKTRONICS
Text Craft

INFOCOM
Zork I, Zork II, Zork III, The Underground Empire The Wizard of Frobozz, The Dungeon Masters, Enchanter, Sorcerer, Suspect, The Witness, Cut-throats, Deadline, Seastalker, Infidel, Planetfall, Suspended, Starcross, Mind Forever Voyager, Invisi Clues, The Hitchhikers Guide to the Galaxy

MICROSOFT
ABasiC

MINDSCAPE
Deja Vu, The Hailey Project, Keyboard Cadet, Amiga Tutor

SUBLOGIC
Radar Raiders

SYNAPSE
CalCraft

ACCOLADE
Sundog

INSIGHT
Financial Time Machine

BORLAND
TURBO PASCAL

CHANG LABS
Rags to Riches

BROUDERBUND
Print Shop, Welcome Aboard

COMPUTER MAIL ORDER

CALL TOLL FREE 1-800-233-8950

EDUCATIONAL INSTITUTIONS CALL TOLL-FREE 1-800-221-4283

477 East Third Street, **DEPT. B903,** Williamsport, PA 17701

SHIPPING: Add 3%, minimum $5.00 shipping and handling on all orders. Larger shipments may require additional charges. All items subject to availability and price change. Returned shipments may be subject to restocking fee.

The Amiga Software Market

By Rob Mitchell

You saw the ads. You read the reviews. You were impressed by the machine's animation, graphics, sound and speed; so you bought an Amiga. Now you're looking for the software that will put you and your computer on that "creative edge."

Amigaworld polled manufacturers to find out what software is available and what kinds of applications Amiga users can expect to see in the near future. The result is the list of software packages that appears on page 45.

This list is not comprehensive since magazine lead times required contacting software vendors in mid-November. By the time you read this, many new packages not announced at press time will be available. As a result, the programs listed in the Table are representative of what's available (and what's soon to be available) for the Amiga this year.

The Table lists products in seven categories: Business, Education, Entertainment, Graphics, Home Productivity, Languages and Utilities and Video. Because many companies were projecting release dates at press time, the Table only lists as available software scheduled for release by December 1985. Release dates for other programs are specified by quarter.

Business Faire

Over 30 business programs are now available or are currently under development for the Amiga. This includes applications for accounting, word processing, spreadsheets, desktop publishing, telecommunications, information management, outline processing, statistical analysis, investment analysis and project management.

Textcraft ($99) is a sophisticated, entry-level word processor developed by Arktronics and marketed by Commodore. It features numerous help screens, tutorials and templates.

Chang Labs' Rags-to-Riches accounting series includes General Ledger, Accounts Payable and Accounts Receivable modules and is available now for $199.95 per module. Chang Labs will introduce Sales Analysis, a point-of-sale retail accounting and analysis program compatible with the Rags-to-Riches series, in the first quarter of '86. Also, Sierra On-Line is developing a version of its One Write accounting software for the Amiga. Price and release date were unavailable at press time.

Integrated software packages for the Amiga include Maximillian, from MaxiSoft (formerly Tardis Software), and Homepak, from Batteries Included.

MaxiSoft's Maximillian includes word processing, spreadsheet/data base, graphics and telecommunications modules. It's available now for $195. Modules will also be available separately. Maximillian's MaxiShare feature allows access to program modules from two computers at the same time. This feature lets persons across the room or across the country edit the same document or spreadsheet simultaneously.

Enhanced stand-alone modules, called MaxiGraph Plus, MaxiTerm Plus, MaxiCalc Plus and MaxiWord Plus will be available in the first quarter of this year. Additional programs planned for release in March include MaxiBase, a database program, MaxiSpell, a spelling checker and MaxiDraw, a drawing program.

Another integrated package, Homepak, from Batteries Included, features a word processor, a data base program, and a telecommunications program, all for $49.95.

The Software Group has released Enable Write from its integrated Enable package. Information about the release of Enable Calc and Enable File was unavailable at press time.

VIP Technologies is developing an outline processor, a word processor, a statistical analysis program, a spreadsheet program, a project manager and a desktop publishing program, all of which will be capable of sharing files. The spreadsheet program, VIP Professional, is currently available. VIP Freelance, a desktop publishing program (no release date), will feature interactive grammar, a spelling checker and a terminal program.

In addition, Aegis Development is working on a background mail/terminal program that will let you send

and receive mail messages while you run other applications on the Amiga.

Software Mimicry

For those interested in running unmodified IBM PC software, Commodore offers The Transformer, a $100 PC/DOS emulation package. The Transformer will let you run Lotus 1-2-3, Symphony, dBaseII, dBase III, Flight Simulator and most Softsell Top 20 software.

The Transformer is a software emulator that sets up an MS/DOS environment. Unfortunately, this puts a burden on the microprocessor so that programs actually run slower than they would on the IBM PC. To get good performance, you also need Commodore's hardware accelerator. This makes IBM PC software run as fast or faster than it does on an IBM.

Commodore anticipated that some major software houses in the business market would wait for the Amiga to establish itself with business users before offering software. Commodore is providing the Transformer to assure Amiga owners an initial supply of standard business software.

Graphics Software

It's no surprise that several developers are introducing graphics and printing programs that take advantage of the Amiga's unique palette of 4,096 shades of color, high-resolution graphics and custom graphics chip.

Graphicraft is Commodore's currently available paint program, which lets you simultaneously display 32 colors selectable from the palette of 4,096.

Aegis Development's Aegis Draw ($199.95), is a drawing/drafting program that you can use with other paint programs. Aegis Draw assists you in generating mechanical drawings or in drawing pictures and is available now.

Aegis also plans to introduce three more graphics packages in the first quarter of 1986. Aegis Images ($69.95) is a menu-driven paint program that features object rotation, magnification, shrinking and airbrushing capability. The airbrush features an adjustable nozzle for controlling spray size and density. Other special effects include color gradiation and a finger-painting option that lets you smear colors across the screen.

Impact ($199) is a presentation business-graphics program from Aegis that lets you create a series of three-dimensional images (tables, "slides," charts and graphs) for video presentations or printing.

For users with more sophisticated needs, Aegis is developing Amiga Pro Draw, a computer-aided design (CAD) package that will feature auto-rotation and auto-drawing capabilities. Aegis is also looking into developing an as yet unnamed 3-D modeling package for the Amiga. Release dates and pricing were unavailable at press time.

Other graphics products scheduled for release in this quarter are The Print Shop from Broderbund Software and Deluxe Print and Deluxe Paint from Electronic Arts.

The Print Shop ($69.95) lets you create custom type styles, borders, graphics designs, and other custom work on a dot-matrix printer. Deluxe Print creates customized printing on dot-matrix printers and integrates with Deluxe Paint, a sophisticated graphics program. (*See our review on page* 72).

Sound Software

Several companies are developing music software for the Amiga. Cherry Lane Technologies plans to introduce Texture ($299), a professional MIDI music sequencer, in the first quarter of this year. Texture records music, modifies it and plays it back through an optional MIDI interface.

Scorewriter is a music composition and printing program from Cherry Lane that runs with Texture. Concertcraft ($79) is a music accompaniment program that follows along as you play through an optional keyboard; it can be used with Pitchrider ($199), a hardware interface For recording and editing. It will be available in the second quarter. [*Concertcraft is the release name of*

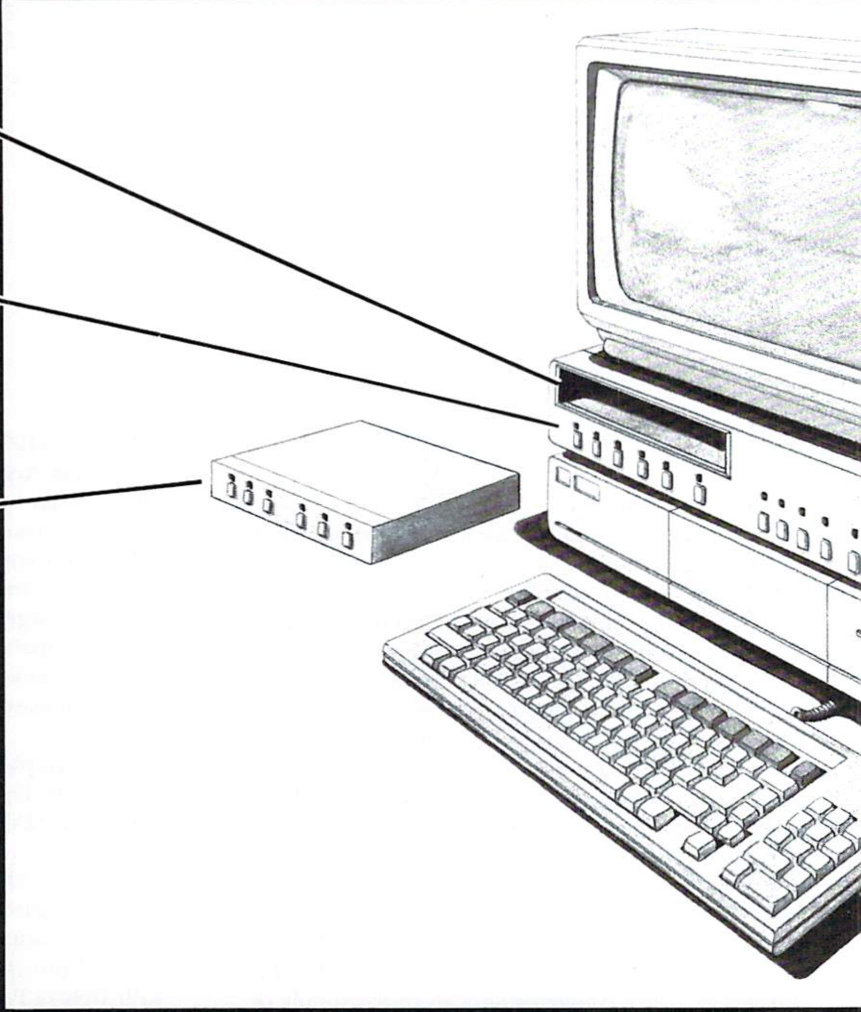
A L L A B

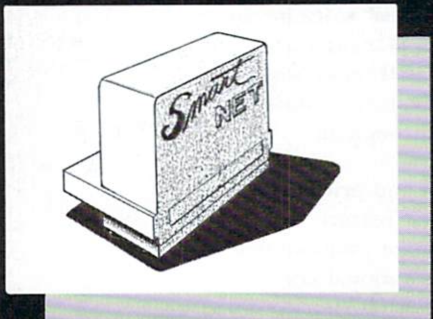
The Buss Station comes with a recessed slot which allows the user to store his most used/popular program diskettes only a fingertip away! The recessed slot can be removed to provide room for the optional DSI "Associate".

A surge, spike, RFI, and EMI interference suppressed, five outlet power control center which allows the Amiga computer, and four peripheral devices to be plugged into one fully protected power source. The front panel of the power controller section of the Buss Station, houses six switches (one is a master switch), each with an LED which lights when the corresponding switch is in the "on" position. Eliminates messy extension cord cabling, and allows the user to switch on/off his computer and all other peripherals from one panel.

The Associate is a multiport data switch which provides two fully switchable serial and parallel output ports for the Amiga. The front panel of the Associate section of the Buss Station houses six switches, each with an LED which lights when the corresponding switch is in the "on" position. The Amiga allows the use of only one serial and parallel device, however, the Associate increases the utility of the Amiga by allowing the use of up to two serial and parallel devices which are selected and controlled by the flick of a switch.

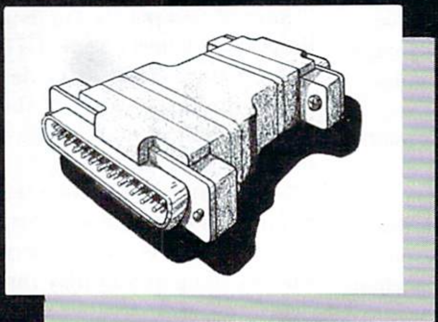
The Buss Station can be ordered with the Associate already installed at our factory or, the Associate can be ordered at a later date and installed at the dealership where the Buss Station was purchased or by the end user at his home.





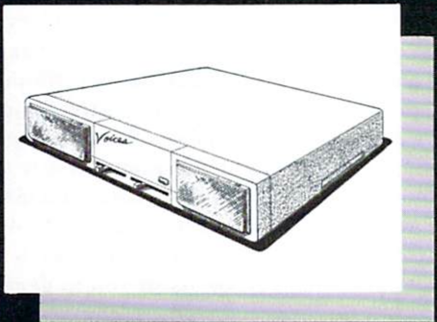
SMARTS

You can give your Amiga Smarts in two different ways. The first method requires a DSI Buss Station, a Smart 1 Ram Expansion Starter Card and up to three Smart 2 Ram Expansion Slave Cards. The second method requires a Smart Net, a Smart 1 Ram Expansion Starter Card and up to three Smart 2 Ram Expansion Slave Cards. The DSI Smart Net is an EMI/RFI shielded metal enclosure which interfaces to the Amiga, provides ports for, and encases the Smart 1 and Smart 2 RAM Expansion Cards. The DSI Smart 1 Ram Expansion Starter Card provides incremental RAM expansion and has the microprocessor circuitry necessary to expand the Amiga to an additional 2 megabytes of RAM. Smart 1 also has an expansion port which allows the user to connect up to three additional Smart 2 Ram Expansion Slave Cards. Each Smart 2 Ram Expansion Slave Card provides up to 2 megabytes of incremental RAM expansion for the Amiga. A combination of one fully loaded Smart 1 Starter Card, and three fully loaded Smart 2 Slave Cards will increase the Amiga's memory to its maximum potential of 8 megabytes. The Smart cards can be ordered with 0k, partially loaded, or fully loaded with 2 megabytes of RAM.



VISIONS

Due to the way the RGB TTL video output circuit of the Amiga was designed, it can properly interface to only a very small percentage of the many RGB TTL monitors on the market today. Visions is a video circuit designed to convert the non-standard RBG TTL video output of the Amiga to a standard IBM PC RGB TTL video output thereby allowing the user to choose from the widest possible variety of monitors available. RGB TTL monitors that can be interfaced to the IBM PC can be interfaced to the Amiga when Visions is used.

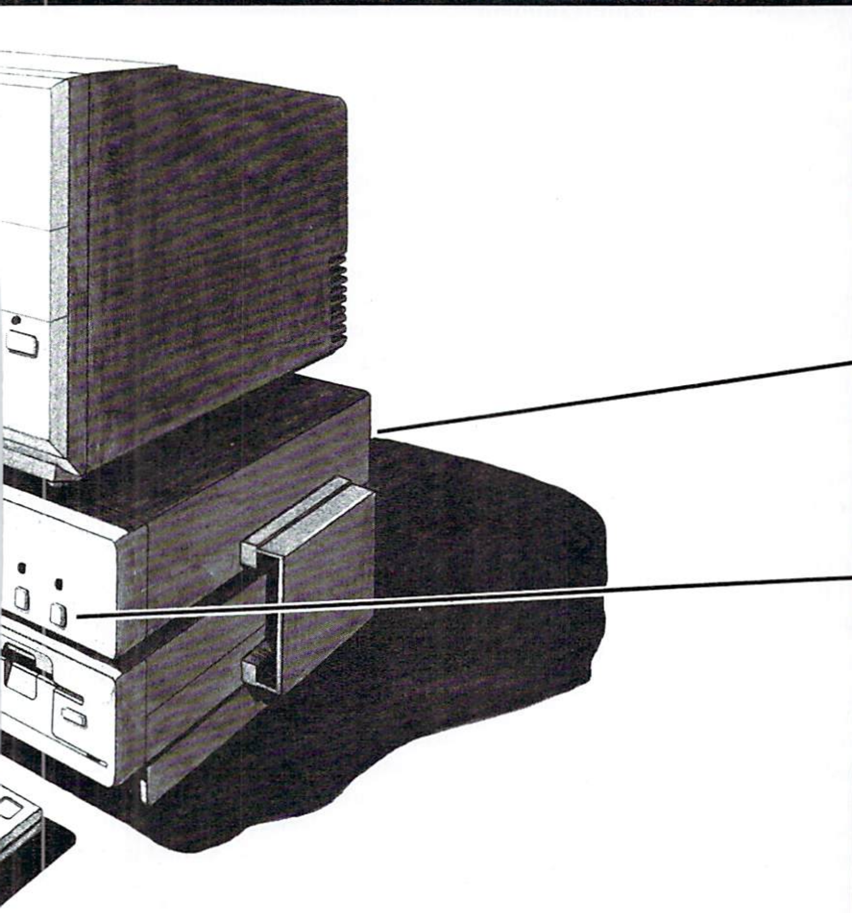


VOICES

Voices is a stereo amplifier with two full range speakers designed to fully utilize the stereo output ability of the Amiga where the use of a home stereo unit is not available or desired. The amplifier and speakers are encased in a low profile/high tech EMI and RFI shielded metal enclosure. Voices provides right and left channel stereo output jacks, which allow the user to connect the Amiga to a home stereo unit if desired and, a headphone jack for situations where quiet or privacy is desired. Voices can be used to provide stereo quality sound for audio and non-audio monitors.

For complete dealer and distributor information concerning the exciting new ine of DSI products please contact your local representative or DSI at the following address:

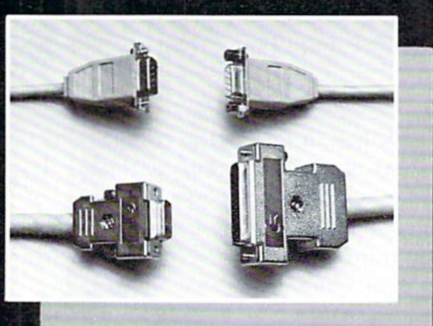
BOARD



A special RAM expansion port which allows the user to plug in the DSI "Smarts" and incrementally increase the memory of the Amiga to its maximum potential of 8 megabytes.

Eight 86 pin card edge connectors, identical to the one on the Amiga, giving it expandability comparable to the IBM PC. The front panel of the slot expansion section of the Buss Station, houses eight switches, each with an LED which lights when the corresponding switch is in the "on" position.

BUSS STATION



INTEREX SYSTEM
INTERFACE CABLES

The only totally comprehensive program of interface cables for connecting the Amiga to virtually all of the most popular analog RGB or digital RGB TTL color monitors, as well as composite monochrome and color monitors, serial printers and modems, parallel printers, keyboards, disk drives and other peripheral devices.



DIRECTOR

The Director is a surge, spike, RFI, and EMI interference supressed 5 outlet power control center for computers and peripherals.



DATA SWITCH

Six Data Switch models allow port expansion and sharing of computer and peripherals.

dsi
717 South Emporia
Wichita, KS 67211-2307
316-264-6118
Telex: 650-193-4977

the product formerly referred to as Harmony. Pitchrider is the correct name of the product we called Pitchwriter in previous issues.—Eds.]

Everyware's Musicraft music synthesizer program, scheduled for release in March, will combine sound and graphics. In the first quarter, Electronic Arts will introduce Instant Music, an accompaniment program that plays three instruments while you use the mouse as your instrument.

Electronic Arts also plans to release a composition program, Deluxe Music Construction Set, in the second quarter.

Video Software

If you want to make your own music videos, several programs for this purpose are available. Electronic Arts' Deluxe Video Construction Set (first quarter release) accepts video input and stores it digitally. You can then enhance the video images using additional music and graphics programs.

Aegis Development's Aegis Animator program ($139.95) lets you create animation on nine story boards. The program uses tweening, a process used in film animation, which makes an object appear to move across a background. The package is currently available and includes Aegis Images so you can create detailed backgrounds.

Languages

In addition to Metacomco's ABasiC, which is bundled with the Amiga, the following programming languages are available: Amiga BASIC (Microsoft); True BASIC (True BASIC, Inc.); Aztec C (Manx Software Systems); Amiga Forth (Creative Solutions); UBZ Forth (UBZ Software); TLC-Logo (The Lisp Co.); Cambridge Lisp 68000, and MCC Pascal 68000 (Metacomco). Also, Borland International is developing a multitasking version of Turbo Pascal for the Amiga, but no release data was available at press time.

Lattice has introduced three C-language cross-compilers for MS/DOS, Unix and VAX systems. Amiga Programmer's Library ($200), from MaxiCorp, includes utilities for transferring binary and text files between PC/DOS and AmigaDOS.

MacBridge Library ($100), from Lattice, lets you convert your C-language Macintosh programs to the Amiga. Other Lattice programs include a screen editor, Lattice Screen Editor ($100); a Unix make utility, LMU ($115); and text management utilities, TMU ($75). All four programs are available now.

Learning Programs

Only a few companies had announced educational programs for the Amiga at press time. Two typing tutor programs, MasterType and Keyboard Cadet, are currently available from Scarborough Systems and Mindscape, respectively.

Entertainment

The largest category of software for the Amiga is entertainment. More than 30 games appear in the table. Most are either already available or will be released in the first quarter of this year. Activision's Mindshadow and Hacker are available now. These are illustrated text adventures featuring colorful graphics screens and mouse interaction with the screens and selection of commands.

A number of Infocom games as well as Infocom's Invisiclues are available now. Sierra On-Line plans to release three adventure games on the Amiga by March. Hayden Software is releasing its Sargon III chess simulation in March. SubLogic's Flight Simulator will feature stereo sound and three-dimensional high-resolution graphics. The program is $49.95 and will be available in the first quarter. Synapse's Mindwheel, Essex and Brimstone ($49.95 each) text adventures will feature voice synthesis and will be available in the first quarter of '86.

Synapse has no release date yet for WyndWalker, a graphics adventure of wizards and sorcery being developed especially for the Amiga's graphics and sound.

Electronic Arts is offering numerous entertainment packages for the Amiga. One-on-One, Skyfox and Seven Cities of Gold are currently available. Also available is Arctic Fox, a new tank simulation game designed to use the Amiga's graphics and sound.

Return to Atlantis is a 3-D underwater simulation that will be available in the first quarter. Adventure Construction Set, scheduled for first-quarter release, lets you program your own adventure games. Also scheduled for the first quarter are Archon and Marble Madness, both arcade games. All games will feature enhanced graphics and sound.

In the second quarter, Electronic Arts plans to release the Pinball Construction Set and Software Golden Oldies, a collection of four "original" computer games: Pong, Adventure, Eliza (interactive psychologist), and Life.

Conclusion

The products described in this article comprise by no means a definitive list of available software for the Amiga. They should, however, give you a good idea of what's available and show that a firm base of software is growing for the machine.

Developers, many of whom have been yawning over the IBM PC's archaic technology, are excited by the Amiga's capabilities and are enthusiastic about writing new software for the computer.

Software that takes full advantage of the Amiga's power, graphics and sound will make current best-sellers on the IBM PC look as obsolete as VisiCalc. The Amiga is setting a new standard from which to judge microcomputers. Its software, and those who develop it, will do the same.■

Address all author correspondence to Rob Mitchell, c/o AmigaWorld *editorial, 80 Pine St., Peterborough, NH 03458.*

BUSINESS

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
Aegis Impact	Business Graphics	Aegis Development	Aegis Development	1st Qtr. '86	199.00	*Creates 3-D business graphics using data from spreadsheets, etc.*
Amiga Calcraft	Spreadsheet	Commodore-Amiga	Synapse Software	January 1986	99.95	*Menu-driven spreadsheet program with auto-sort and windowing features. Files are compatible with VisiCalc.*
Amiga Textcraft	Word Processing	Commodore-Amiga	Arktronics	Available	99.95	*Simple word processing program that inlcudes on-screen documentation and templates for business letters.*
Amiga Transformer	Emulation Software	Commodore-Amiga	Simile Research	January '86	99.95	*Software tranforms the Amiga into an MS/DOS machine for running IBM PC software.*
BBS-PC	Telecommunications	Micro Systems Software	Micro Systems Software	Available	99.00	*Messaging software for the Amiga.*
Enable Write	Word Processor	The Software Group	The Software Group	NA	NA	*Word processor.*
IS-Paperclip Elite	Word Processor	Batteries Included	Batteries Included	NA	NA	*Word processor with graphics and window functions.*
IS-Portfolio	Investment Tracker	Batteries Included	Batteries Included	2nd Qtr.	NA	*Investment portfolio analysis and tracking system. Will include graphics, icons and telecommunications.*
IS-Talk	Telecommunications	Batteries Included	Batteries Included	2nd Qtr. '86	NA	*Terminal package that includes a word processor and spelling checker.*
Lionheart	Business and Statistical Software	Lionheart Software	Lionheart Software	Available	95.00–145.00	*A number of statistically oriented business packages including Business statistics, Multivariate Analysis and more.*
MaxiBase	Database	MaxiSoft	MaxiSoft	March '86	150.00	*Database program that shares files with other MaxiSoft programs.*
Maxi Plan	Spreadsheet	MaxiSoft	MaxiSoft	1st Qtr. '86	150.00	*Enhanced version of MaxiCorp's Maximillian spreadsheet module.*
MaxiGraph Plus	Business Graphics	MaxiSoft	MaxiSoft	1st Qtr. '86	150.00	*Enhancement of Maximillian's MaxiGraph graphics module.*
Maximillian	Integrated Software	MaxiSoft	MaxiSoft	June '86	195.00	*Integrated spreadsheet, word processor, graphics and terminal emulation software. Multitasking, concurrent data sharing on two computers.*
MaxiSpell	Spelling Checker	MaxiSoft	MaxiSoft	March '86	150.00	*Spelling-checker program.*
Maxicomm	Telecommunications	MaxiSoft	MaxiSoft	1st Qtr. '86	49.95	*Enhanced version of MaxiTerm program in Maximillian integrated software.*
MaxiWord Plus	Word Processor	MaxiSoft	MaxiSoft	1st Qtr. '86	150.00	*Enhanced version of MaxiWord word processor used in Maximillian integrated software.*

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
On Line!	Telecommunications	Micro-Systems Software	Micro-Systems Software	Available	69.00	*Sophisticated terminal program.*
One Write	Accounting	Sierra On-Line	Sierra On-Line	NA	NA	*General ledger accounting using the single-entry system.*
ParBiz I	Financial Package	PAR Software	PAR Software	Available	129.00	*Includes key business ratio analysis, financial statements, loan evaluations and more.*
ParReal I	Real Estate	PAR Software	PAR Software	Available	129.00	*Includes property investment analysis, financial statements, amortization tables, loan evaluations and more.*
Rags-to-Riches Series	Accounting	Chang Labs	Chang Labs	Available	199.95/ module	*General Ledger, Accounts Payable and Accounts Receivables accounting programs for small business.*
Sales Analysis	Retail Sales	Chang Labs	Chang Labs	NA	NA	*Point-of-sale accounting and sales analysis package.*
Amiga Telecraft	Telecommunications	Commodore-Amiga	Software 66	February 1986	79.95	*Terminal emulation program.*
UniCalc	Spreadsheet	Lattice	Lattice	Available	79.95	*Spreadsheet program featuring windowing and program customizing. Compatible with other spreadsheet programs.*
VIP Analysis	Statistical Analysis	VIP Technologies	VIP Technologies	NA	NA	*Statistical analysis program. Integrates with other modules in VIP series.*
VIP Consultant	Project Manager	VIP Technologies	VIP Technologies	NA	NA	*Project management program; can share information with other VIP series programs.*
VIP Forethought	Outline Processor	VIP Technologies	VIP Technologies	NA	NA	*VIP series outline processing program can share information with other VIP programs.*
VIP Freelance	Desktop Publishing	VIP Technologies	VIP Technologies	NA	NA	*Word processor; includes interactive grammar, spelling checker, terminal program. Integrates with other VIP programs.*
VIP Professional	Spreadsheet	VIP Technologies	VIP Technologies	NA	NA	*Lotus 1-2-3-type spreadsheet program.*

EDUCATION

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
The Halley Project	Educational Game	Mindscape	Tom Snyder Productions	Available	49.95	*A fun way to learn about the Solar System.*
Keyboard Cadet	Typing Tutor	Mindscape	Mindscape	Available	39.95	*Typing tutor program.*
Mastering the SAT	Test Preparation	CBS Software	CBS Software	2nd Qtr. '86	99.95	*Tutorial program prepares high-school students to take the Scholastic Aptitude Test (SAT).*

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
MasterType	Typing Tutor	Scarborough Systems	Scarborough Systems	Available	49.95	*Typing tutor program.*
QUINK	Educational Game	CBS Software	CBS Software	2nd Qtr. '86	34.95	*Educational game in which one or more players make associations between a list of subjects and eliminate subjects which don't fit.*

ENTERTAINMENT

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
Adventure Construction Set	Game	Electronic Arts	Electronic Arts	1st Qtr. '86	NA	*Program your own adventure game.*
Archon	Game	Electronic Arts	Electronic Arts	1st Qtr. '86	40.00	*Three-dimensional arcade/strategy game.*
Archon II: Adept	Game	Electronic Arts	Electronic Arts	NA	NA	*Arcade/strategy game.*
The Black Cauldron	Adventure Game	Sierra On-Line	Sierra On-Line	March '86	39.95	*Graphics adventure game based on Disney movie of the same name.*
Brimstone	Text Adventure	Synapse	Synapse	1st Qtr. '86	44.95	*Electronic novel pits you and your Knights of the Round Table against Ulro and the underworld. Uses Amiga's speech synthesis.*
Deja Vu	Adventure Game	Mindscape	Mindscape	Available	NA	*This graphics text adventure is a 1940's style mystery in which you must overcome your amnesia.*
Driving game	Racing Game	Commodore-Amiga	Design Labs	2nd Qtr. '86	49.95	*Driving game puts you in the cockpit of a race car.*
Essex	Text Adventure	Synapse	Synapse	1st Qtr. '86	44.95	*Search and rescue mission aboard the starship Essex. Electronic novel features voice synthesis through the Amiga.*
Flight Simulator	Arcade game	SubLogic	SubLogic	1st Qtr. '86	49.95	*Fly a Cessna 182 or a Lear Jet. Stereo sound, 3-D high-resolution graphics.*
Gunship	Simulation	MicroProse	MicroProse	Spring '86	39.95	*Fly an attack helicopter.*
Hacker	Adventure Game	Activision	Steve Cartwright	Available	44.95	*Strategy adventure in which you must break into a computer.*
Infocom Games	Adventure Games	Infocom	Infocom	Available	34.95 each	*All 19 Infocom games plus Invisiclues are available for the Amiga.*
King's Quest	Adventure Game	Sierra On-Line	Sierra On-Line	March '86	49.95	*Animated text adventure.*
King's Quest II	Adventure Game	Sierra On-Line	Sierra On-Line	March '86	49.95	*Enhanced version of King's Quest. 3-D graphics.*
Marble Madness	Arcade game	Electronic Arts	Electronic Arts	1st Qtr. '86	NA	*Adaptation of commercial arcade game includes high-resolution animation and sound effects.*

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
Mindshadow	Adventure Game	Activision	Interplay Productions	NA	44.95	*In this graphics text adventure, you have lost your memory and must find your true identity.*
Mindwheel	Text Adventure	Synapse	Synapse	1st Qtr. '86	44.95	*Travel through time to save the earth. Electronic novel from Synapse uses Amiga's voice synthesizer.*
Napoleon at Waterloo	Strategy Game	Krentek Software	Krentek Software	NA	34.95	*Battle at Waterloo simulation in real-time with enhanced graphics.*
One-on-One	Basketball Game	Electronic Arts	Electronic Arts	Available	40.00	*Larry Bird and Dr. J bring their act to the Amiga.*
Pinball Construction Set	Arcade Game	Electronic Arts	Electronic Arts	2nd Qtr. '86	NA	*Design your own electronic pinball game.*
Return to Atlantis	Arcade Game	Electronic Arts	Electronic Arts	1st Qtr. '86	NA	*Underwater simulation in 3-D.*
Robot War	Arcade Game	Commodore-Amiga	Commavid	1st Qtr. '86	49.95	*Robot warfare arcade game.*
Rome and the Barbarian	Strategy Game	Krentek Software	Krentek Software	NA	34.95	*Real-time strategy game in which you wage war during the fall of the Roman Empire. Play is against opponents on other computers.*
Sargon III	Chess Game	Hayden Software	Hayden Software	March '86	NA	*Chess simulation.*
Seven Cities of Gold	Adventure Game	Electronic Arts	Electronic Arts	Available	40.00	*Text/graphics adventure.*
Silent Service	Simulation	MicroProse	MicroProse	Spring '86	34.95	*Simulation of submarine combat during WWII.*
Skyfox	Flight Simulation	Electronic Arts	Electronic Arts	Available	40.00	*High-resolution combat flight simulation.*
Software Golden Oldies	Games	Electronic Arts	Electronic Arts	2nd Qtr. '86	NA	*Original Pong, Adventure, Eliza (interactive psychologist) and Life computer games.*
StarFlight	Arcade Game	Electronic Arts	Electronic Arts	NA	NA	*Science fiction space adventure.*
Wynd Walker	Arcade Game	Commodore-Amiga	Synapse	January 1986	49.95	*The subject is sorcery in this arcade game that takes advantage of Amiga sound and graphics.*

GRAPHICS

Aegis Draw	Drawing/Drafting	Aegis Development	Aegis Development	Available	199.95	*Scaled-down computer-aided design (CAD) drawing program creates charts, diagrams and architectural drawings.*
Aegis Images	Paint Program	Aegis Development	Aegis Development	1st Qtr. '86	69.95	*A paint program with airbrushing, color gradiation, object rotation, shrinking and magnification, image cloning and other features.*

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
Aegis Pro Draw	Computer-Aided Design	Aegis Development	Aegis Development	NA	NA	*Programmable CAD system running under Intuition, incorporating auto drawing and rotation in high-resolution 3-D graphics.*
Amiga Graphicraft	Paint Program	Commodore-Amiga	Commodore-Amiga	Available	49.95	*Paint program lets you display 32 colors for graphics and animation.*
Deluxe Paint	Paint Program	Electronic Arts	Electronic Arts	1st Qtr. '86	NA	*Paint program that integrates with Deluxe family Graphics, Music and Printing modules.*
MaxiDraw	Drawing Program	MaxiSoft	MaxiSoft	March '86	150.00	*Drawing program. Files can be integrated into other MaxiSoft programs.*

HOME PRODUCTIVITY

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
Deluxe Print	Printing	Electronic Arts	Electronic Arts	1st Qtr. '86	NA	*Printing program that integrates with Deluxe Graphics Construction Set.*
Financial Cookbook	Home Finance	Electronic Arts	Electronic Arts	1st Qtr. '86	50.00	*Formulas for home financial planning.*
Gizmoz Productivity Set	Desktop Accessories	Digital Creations	Digital Creations	January '86	49.95	*Fifteen desktop accessories including a calendar, indexing, memo pad, calculators, clock, terminal and graph packages.*
Homepak	Integrated Software	Batteries Included	Batteries Included	NA	NA	*Integrated word processor, database and telecommunications programs.*
ParHome I	Home Finance	PAR Software	PAR Software	Available	69.00	*Includes checkbook accounting and budgets, IRA vs. CD planner, loan amortization, personal financial statements, life insurance and college investment planners and more.*
The Print Shop	Printing Program	Broderbund	Broderbund	February '86	69.95	*A printing program with graphics and text editors for creating custom print styles and designs on dot-matrix printers.*

LANGUAGES AND UTILITIES

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
Amiga Assembler	Assembler	Commodore-Amiga	Metacomco	Available	99.95	*Macro assembler/linker program includes libraries and AmigaDOS Developer's Manual.*
Amiga C Cross-Compiler/MS/DOS	Cross-compiler	Lattice	Lattice	Available	500.00	*MS/DOS to AmigaDOS cross-compiler.*
Amiga C Cross-Compiler/Unix	Cross-compiler	Lattice	Lattice	Available	NA	*C language cross-compiler converts between Unix and AmigaDOS.*
Amiga C Cross-Compiler/VAX	Cross-compiler	Lattice	Lattice	Available	NA	*Vax to AmigaDOS cross-compiler program.*

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
Amiga Forth	Language	Creative Solutions	Creative Solutions	Available	NA	*Forth language featuring multitasking and real-time applications.*
Amiga LISP	Language	Commodore-Amiga	Metacomco	Available	199.95	*Cambridge LISP 68000 interpreter/ compiler program.*
Amiga Pascal	Language	Commodore-Amiga	Metacomco	Available	199.95	*ISO-validated Pascal programming language.*
Amiga Programmer's Library	Utility	MaxiSoft	MaxiSoft	Available	200.00	*Program development utilities for the Amiga.*
Amiga TLC Logo	Language	Commodore-Amiga	The Lisp Co.	1st Qtr. '86	99.95	*Educational programming language.*
Aztec C68K/ Am	Language	Manx	Manx	Available	199.00–499.00	*C compiler program available in three programming levels.*
dBC III Library	Utility	Lattice	Lattice	Available	150.00	*C language utilities for creating, accessing and updating dBASE III files.*
Lattice C for Amiga	Language	Commodore-Amiga	Lattice	Available	149.00	*C language compiler program including linker, libraries and "include" source files.*
Lattice Make Utility	Utility	Lattice	Lattice	Available	125.00	*Unix-compatible, system-rebuilding utility.*
Lattice Screen Editor	Screen Editor	Lattice	Lattice	Available	100.00	*Menu-driven screen-editor program features multiple windows and a multitasking mode.*
MacBridge Library	Utility	Lattice	Lattice	Available	100.00	*These C-language programming routines include programs that let you convert your Apple Macintosh programs to run on the Amiga.*
Panel	Utility	Lattice	Lattice	Available	195.00	*Creates screen layouts for your programs. Includes a screen layout editor, subroutine library and utility programs.*
Text Management Utilities	Utility	Lattice	Lattice	Available	75.00	*Eight programs for examining and editing program or text files.*
Turbo Pascal	Language	Borland International	Borland International	NA	NA	*Borland's popular high-speed Pascal compiler.*
UBZ FORTH	Language	UBZ Software	UBZ Software	Available	85.00	*Implementation of FORTH featuring FORTH-83 word set. Includes source code.*
WACK Software Toolkit	Utility	Commodore-Amiga	Metacomco	Available	99.95	*Multitasking symbolic debugger for Amiga Assembly and Lattice C languages.*

MUSIC

PRODUCT	APPLICATION	PUBLISHER	DEVELOPER	AVAILABLE	PRICE	DESCRIPTION
Amiga Musicraft	Music Composition	Commodore-Amiga	Everyware Inc.	February '86	99.95	*Music composer/synthesizer program.*
Deluxe Music Construction Set	Music Composition	Electronic Arts	Electronic Arts	2nd Qtr. '86	NA	*Music composition program integrates with Deluxe Video to create MTV-style videos.*
Instant Music	Musical Accompaniment	Electronic Arts	Electronic Arts	1st Qtr. '86	NA	*The Amiga accompanies you with the sound of three instruments while you create music using a mouse.*
Scorewriter	Music Printing	Cherry Lane Technologies	Cherry Lane Technologies	Available	NA	*Music composition and printing program that runs with Texture.*
Sound Vision	Music/Graphics	Hayden Software	Hayden Software	March '86	NA	*Music/animation program.*
Texture	Music Sequencer	Cherry Lane Technologies	Cherry Lane Technologies	1st Qtr. '86	299.00	*Professional-level, 8-track MIDI music sequencer lets you record, modify and play music on the Amiga.*

VIDEO

Aegis Animator	Animation	Aegis Development	Aegis Development	Available	139.95	*Lets you create animated scenes on nine storyboards. Includes Aegis Images paint program for creating backgrounds.*
Amiga Live!	Digitizer	Commodore-Amiga	A-Squared Systems Group	1st Qtr. '86	300.00	*Real-time video frame grabber/digitizer. Digitizes and manipulates video input, lets you use graphics programs to modify images.*
Deluxe Video Construction Set	Video	Electronic Arts	Electronic Arts	1st Qtr. '86	NA	*Input, store and alter video images on the Amiga. Add sound and graphics with additional Deluxe family modules.*

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Caveat Lector

This article was produced in November 1985. Certain unwritten laws of magazine, and especially software, publishing should guarantee that some of what we are presenting here will be inaccurate when this issue hits the newsstands. At the time this article was done, "hard-and-fast" information was not very easy to come by. We think Rob did a fine job considering the mercurial nature of software for new machines; we also believe that this will give you a good idea of what's out there. We will be giving updates and clearing up inaccuracies in future issues. If you are a developer or a manufacturer with a product we should have mentioned, or if you have a new one, please send us the information.

—Editors

Basic Graphics

By Gil Dodgen

Experimenting with Amiga's graphics using ABasiC

When I became the proud owner of a new Amiga, I decided that I would see what I could do in Basic, with as few lines of code as possible, to exploit the graphics capabilities of the machine. What follows is a set of variations on a random number-generated graphics program, written in ABasiC.

Listing 1 shows the initial program. The RND function generates a floating-point number between 0 and 1. A triangle is formed by specifying its three corners (x1,y1, to x2,y2 to x3,y3) with the RND result multiplied by the limits (in pixels and scan lines) of the monitor. The Area function connects the three points with the outline (penO) color and fills the enclosed area with the colors specified by penA and penB. These colors are also chosen at random within the range permitted for the default color registers. (Notice that numbering starts with 0 so that the 32 registers must be specified by RND*31.) Since the graphics will overwrite the instructions printed on the screen, the Sleep statement gives you five seconds to read these instructions, which explain how to exit the program and clear the screen. The Get statement constantly polls the keyboard and terminates program execution when the space bar is pressed.

When I first ran this program, I was amazed at the speed with which it executed. In fact, you may find that it results in a kind of sensory overload.

Listing 2 was my first variation on the concept. In this version, the program output is directed into the window specified by the Window statement. Note line 290: In order to alleviate the sensory overload problem mentioned earlier, I put this randomized time delay into the generation of the triangles. The random-number generator in this statement will create a number between 0 and 3,000. Since the number must fall between 0 and 31, it will try and try again until it gets it right. By changing the size of the time delay, you may find it necessary to resize or move the window in order for the space bar to have its desired effect.

Version 3 is probably the most fascinating. Originally, I set up the For. . .Next loop to increment the coordinates of the corner of the triangles. Unfortunately, this resulted in the rather uninteresting effect of the triangles growing toward the lower right corner of the screen. After this attempt, I decided to decrement some of the coordinates. This produces a pseudo-3D effect with the triangles twisting and turning while leaving behind them a pattern in the ouline color specified by penO. Line 540 keeps the coordinates from exceeding the limits of the screen. Without this line, the computer's memory will fill and the program will crash.

Version 4 randomizes the outline color by placing its RND specification in the For. . .Next loop. This creates the same twisting 3D effect, but leaves behind a multicolored pattern.

These programs should give you a point of departure to start experimenting on your own. For example, try chaining the programs by substituting the Chain command for the Then End statement. Shapes with more than three corners might be tried, or you might try randomizing the penA and penB colors in the For. . .Next loop. Also, try experimenting with the Circle, Linepat and Pattern commands.

The fact that such interesting graphics routines can be written with just a few lines of Basic is a real testimony to the power of this machine. Equally impressive is the

speed with which the computer can display the images. By timing the execution of the For. . .Next loop, I determined that the computer is calculating the parameters for, and displaying, about 30 triangles per second! This means that animation should be possible without sprite graphics as long as calculations are kept reasonable.

I am now even more anxiously awaiting the arrival of my Lattice C compiler for the Amiga. With the much greater speed of compiled C, and the ability to custom tailor mathematical functions to calculate only the degree of accuracy that is absolutely necessary, the possibilities are mind-boggling. Since the Motorola 68000 is free to perform these calculations without having to worry about actually generating the graphics, the future of animated graphics on the Amiga should be exciting indeed.■

Gil Dodgen is editor of Hang Gliding *magazine. You can reach him at 12642 Dottie Circle, Garden Grove, CA 92641.*

Listing 1. *Triangles 1.bas*

```
 10 Rem Triangles1.bas
 20 Rem
 30 Rem Program to generate colored triangles.
 40 Scnclr
 50 Randomize -1
 60 Print "Press space bar to end."
 70 Print "Type """scnclr""" to clear screen."
 80 Sleep 5*10^6
 90 x1=rnd*320: x2=rnd*320: x3=rnd*320
100 y1=rnd*200: y2=rnd*200: y3=rnd*200
110 a=rnd*31: b=rnd*31: c=rnd*31
120 penA a: penB b: penO c
130 Get A$
140 If A$ = " " Then End
150 Area (x1,y1 to x2,y2 to x3,y3)
160 Goto 90
```

Listing 2. *Triangles 2.bas*

```
200 Rem Triangles 2.bas
210 Scnclr
220 Randomize -1
230 Print "Press space bar to end."
240 Print "Size window to suit."
250 Window #1, 100, 100, 80, 80,
    "TRIANGLES"
260 Cmd#1
270 Get A$: If A$= " " Then End
280 x1=rnd*320: x2=rnd*320: x3=rnd*320
290 y1=rnd*200: y2=rnd*200: y3=rnd*200
300 a=rnd*31: b=rnd*31
310 c=rnd*3000: If c>31 Then 310
320 penA a: penB b: penO c
330 Area (x1,y1 to x2,y2 to x3,y3)
340 Goto 270
```

Listing 3. *Triangles 3.bas*

```
400 Rem Triangles 3.bas
410 Scnclr
420 Randomize -1
430 Print "Press space bar to end."
440 Print "Type """scnclr""" to clear screen."
450 Sleep 3*10^6
460 Get A$ : if A$=" " Then End
470 x1=rnd*320: x2=rnd*320: x3=rnd*320
480 y1=rnd*200: y2=rnd*200: y3=rnd*200
490 a=rnd*31: b=rnd*31: c=rnd*31
500 penA a: penB b: penO c
510 For i=1 to 100
520 x1=x1+1: y1=y1+1
530 x2=x2+1: y2=y2-1
540 x3=x3-1: y3=y3+1
550 If x1>319 or y1>199 or x2>319 or y2<1
    or x3<1 or y3>199 Then 580
560 Area (x1,y1 to x2,y2, to x3,y3)
570 Next i
580 Goto 460
```

Listing 4. *Triangles 4.bas*

```
600 Rem Triangles 4.bas
610 Scnclr
620 Randomize -1
630 Print "Press space bar to end."
640 Print "Type """scnclr""" to clear screen."
650 Sleep 3*10^6
660 Get A$ : if A$=" " Then End
670 x1=rnd*320: x2=rnd*320: x3=rnd*320
680 y1=rnd*200: y2=rnd*200: y3=rnd*200
690 a=rnd*31: b=rnd*31
700 penA a: penB b
710 For i=1 to 100
720 x1=x1+1: y1=y1+1
730 x2=x2+1: y2=y2-1
740 x3=x3-1: y3=y3+1
750 If x1>319 or y1>199 or x2>319 or y2<1
    or x3<1 or y3>199 Then 790
760 c=rnd*31: penO c
770 Area (x1,y1 to x2,y2 to x3,y3)
780 Next i
790 Goto 660
```

Programming on the Amiga: MCC Pascal

By Daniel Zigmond

In the last issue, we examined the programming language Cambridge Lisp 68000. This month we will look at another product from Metacomco: MCC Pascal. It too is a developer's-level language for the Amiga, but there are several key differences, both positive and negative.

Pascal

The first description of Pascal was the *Pascal User Manual and Report*, written by Kathleen Jensen and Niklaus Wirth almost a decade ago. Since then, the language has met with phenomenal success. It was the first structured language, making it useful as an intellectual stimulant as well as a practical and sophisticated tool. It has a very readable syntax. For example, in Fortran, an If statement might look like:

```
100 FORMAT (I10)
      IF (NUMBER .LT. 305) WRITE (6,100) NUMBER
```

while in Pascal this would be:

```
IF NUMBER < 305 THEN WRITE(NUMBER);
```

The difference is quite striking.

Pascal's While, Repeat and even For are a joy compared to Fortran's Do. Pascal supports sets and recursion; in general, Pascal has significantly advanced the field of computer science.

Pascal has become the de facto teaching tool of computer science. It is rare for introductory computer courses not to cover Pascal (although this is slowly changing), and a vast majority of advanced courses use Pascal as a vehicle to teach complex concepts. Most advanced computer science textbooks are now Pascal-oriented.

Although the industry is beginning to use C as its primary tongue, Pascal is still used extensively for commercial software development. For a while, Pascal was the only language that Apple supported for Macintosh programming. As is the case with the Amiga, Pascal is typically among the first languages to be implemented on a new computer.

MCC Pascal

It is impossible for a language to become popular without being available for a wide variety of machines. Because all computers have their own strengths and weaknesses and all implementors have their own likes and dislikes, specialized dialects of computer languages are quick to form. While such diversity is somewhat useful and often leads to a gradual modernization of the language (as is the case with Lisp), it necessarily sacrifices the portability of code. Pascal has been no exception to this rule. Rival versions of Pascal sprang up soon after it became popular, and many more exist today.

To curb the trend towards incompatibility, the British Standards Institution began to design a "standard Pascal." The International Standards Organization published a final report in 1982, which specified exactly how a Pascal ought to work. Of course, such a standard is only effective if everyone agrees to follow it. Not everybody did. However, it has achieved enough popularity to make it useful. MCC Pascal makes every attempt to adhere to ISO specifications. It is documented as a level 0 implementation of the ISO 7 185/BS 6192 description, and, while this by no means implies full compatibility with every Pascal, it is a nice feature.

MCC Pascal is quite complete and therefore quite powerful. It includes a great many data types for representing numbers, characters, text files and Boolean values. Both real and integer numbers are supported. There are the usual structured types: enumerations, subranges, arrays, sets and records.

All the expected control structures are present: While, If, Repeat, Case, For, etc. MCC Pascal contains all function- and procedure-defining statements. More advanced features include the forward directive, point-

Code can be transported from another machine through AmigaTerm and compiled as a text file; there are no complicated file protocols as there are with Pascal on the Apple II. MCC Pascal is a utility, not an environment.

ers, dynamic variables, recursion and Write and Writeln formatting. Of course, the basic arithmetic functions, conversions and comparisons are supported. A source at Metacomco claims that it is possible to do graphics and sound in MCC Pascal, but it is very difficult. Future versions will provide many additional procedures for easing this task. In short, the MCC Pascal implementation leaves very little to be desired.

Using MCC Pascal

MCC Pascal is not truly a "development system" in the way Cambridge Lisp is. Programs must be written using a standard text editor (EDIT, most likely) and linked with ALINK, the standard Amiga linker. MCC Pascal is only a compiler. While this obviously detracts from the simplicity of the package, it gives the user a great degree of freedom. The MCC Pascal user will have no problem making use of more powerful editors as they become available. Code can be transported from another machine through AmigaTerm and compiled as a text file; there are no complicated file protocols as there are with Pascal on the Apple II. MCC Pascal is a utility, not an environment.

An added bonus of the system is that Metacomco is working on a compatible compiler for the Atari ST. This allows developers to make their products available to users of that system. Other implementations currently exist on a few less popular machines, and more will probably be attempted.

Documentation

Documentation is not usually a big issue for development systems. Quality tutorials are extremely hard to write, and I would not recommend a software manufacturer to even attempt it. Metacomco acknowledges that there are already several quality Pascal texts, and therefore does not include one of their own for MCC Pascal. It is unfortunate that they name no specific books, but such works are easy to find.

However, a good reference manual is an essential for a language, and, sadly, MCC Pascal does not have one. In fact, the MCC Pascal manual may be the worst piece of documentation I have ever read.

At first glance, the manual, although fairly long, is lacking two major things: a table of contents and an index. There is a page labeled Table of Contents, but it is a rough, and often inaccurate, outline of the book. No page numbers are provided, leaving it all but useless. In a system as powerful as MCC Pascal, a good index is an absolute essential, and Metacomco neither provides one nor offers any substitute, such as a glossary or quick-reference section.

A more detailed look at the manual reveals a horrendous number of errors, both technical and typographical, and complete disorganization. Spacing, capitalization, underlining and type faces are used inconsistently. Headings and subheadings are intermixed with almost no apparent logic. The structure of sentences and paragraphs is very awkward and sometimes just plain wrong. Even major sections of chapters are completely misplaced. Where the text is readable, it is often vague or misleading. Those who know Pascal well can discard the manual completely if they are willing to work by trial and error. Any novices patient enough to work through the text will only find themselves frustrated and confused upon completion.

Alternatives

It is painful to dismiss a good language solely because it is poorly documented. In fact, MCC Pascal is close enough to ISO Pascal to be used without its own reference manual. Still, it is a package that would take great effort to use. My advice to Pascal enthusiasts is to hold out for either a new release of MCC Pascal or Turbo Pascal from Borland. The latter will probably be considerbly less expensive and possibly better, but its availability is still uncertain. Those who simply want to start programming their Amiga should give serious thought to Lattice C. It is both powerful and well documented.

Summary

Don't buy MCC Pascal. . .yet. The software is good, but its quality is hidden behind awful documentation. Either hold out for better Pascals or use a different language altogether. At this point, MCC Pascal will only bring you hours of grief.■

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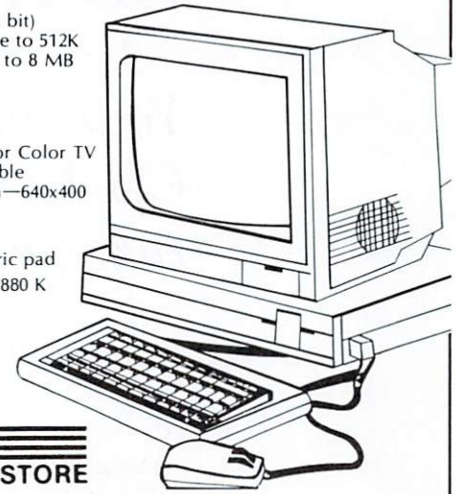
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CD ROM: The Future of Memory?

Your entire software library would probably fit on one CD ROM. This new technology represents a quantum leap over magnetic memory storage.

By Joseph Rotello

Just about everything we see in the microcomputer field was or is the result of what can only be termed a revolution. First there was the vacuum tube, then the solid state device, and finally, integrated circuits. Along came the mainframe (more aptly described as the houseframe) computers and the minicomputers. Finally came the "desktop" micros and the laptop computers of today.

A similar revolution has taken place in the related technology of data storage and retrieval units. First there were punched cards and paper tape, then came the magnetic media and all was quiet on the mass storage front...or was it? Another revolution is about to take place, this time with the unlikely name of CD, or CD ROM.

More than being just another acronym in the long history of computerdom's abbreviations, the Compact Disc Read Only Memory promises to become a significant catch phrase in the world of microcomputing. You most likely have already seen them in use as concert-quality audio "records" that produce unheard-of sound quality with the aid of a laser beam. In fact, the only real difference between the CD being used to play back Mozart and the one used to store last year's corporate earnings report is in the type of data applied to each.

It happens that the same binary data that represents music on a CD can and does work splendidly for the storage of computer data. In fact, even the mechanical differences between the audio and computer CD storage units is very minor, leading to the distinct possibility that the age of floppy and hard disk drives may be swiftly drawing to an end.

Gigantis Strikes

What makes the CD so attractive is that it represents a quantum leap in storage capacity. Whereas floppy and hard disk storage capacity has been measured in megabytes and tens of megabytes, we will have to get used to seeing CD ROM capacities measured in the *hundreds* of megabytes, and even with a new computer term—*gigabytes*. The storage potential for literally billions of bytes now exists, and even the small CD offers over 500 million bytes of data storage on a disk the size of a 45 rpm record.

This enormous increase in storage capacity is made possible by a little bit of applied physics. A floppy or hard disk stores data via a magnetic head that either records or reads the data applied to the magnetic media. The density of the recorded media is mostly dependent on the fact that the highest quality magnetic head can be produced only to a limited tolerance—limited by the width of the magnetic head itself. In a CD ROM system, the data is written and read off the disk by laser beam. One laser beam can be focused to near infinitesimal limits, thus allowing a great increase in the density at which data is recorded, and a corresponding increase in the total storage capacity. Additionally, the laser in a CD drive never actually touches the disk, meaning that a CD can and should last a proverbial lifetime. In fact, you could very well grab a CD, hold it under water, wipe it off and be very confident that it will perform properly.

Possibilities

With this much memory storage available, one would think that the outlook for the CD ROM could be endless. In reality, this outlook takes on a rather mixed suit ►

Photograph by Ed Judice



◄ of clothes, as there are both pros and cons relating to this new storage medium.

Without a doubt, the software market as it exists today will undergo some very fundamental changes. It is now possible to store not only text, but also large amounts of graphics, bit-mapped (very high-resolution) data and more, on the same disk and at the same time. What's more, this storage capacity makes it possible and economical to store many different operating systems or versions of the same program on the same CD. For example, one CD would be able to hold such diverse operating systems as AmigaDOS, MS-DOS, UNIX and GEM all on the same disk. Another might hold the entire three-year records of a medium-sized university or large corporation.

As odd as it may seem, the ability to hold such large amounts of diverse material brings about a problem of its own. Existing software, measured in present day kilobyte sizes, pales to insignificance compared to the enormous storage capacity of even one CD. It is quite possible that the software to take real advantage of this asset might be available only many months after the CD ROM drive itself is introduced, if for no other reason than that it might take that long just to develop that great an amount of code. Quoting Les Cowan, of *Optical Memory News*, "I can see putting a program like Lotus on a single CD ROM along with ten godzillion help screens, complete documentation and still have most all of the disk left over for something else. . . ."



One natural use for CD ROMs may very well be in real estate. One can imagine putting complete descriptions of homes, plus explanatory text, plus high-resolution color graphics or digitized pictures of same, all on one disk.

Business Transformed

For the business user, the initial CD ROM use may well center on large and diverse databases containing literally millions of pieces of archived data on a relatively small number of CD ROMs. It is no secret that, already, the Library of Congress stores virtually all of the seven million plus Card Catalog Records on large optical disks ready for immediate recall. Plans are already under way to store the great mass of encyclopedias on optical disks, thus allowing much faster and easier access to this knowledge base via modem-equipped businesses and private individuals. Corporations will have a newfound ability to store and recall massive files dating back years, all on one or two rather large-capacity optical disks. Indeed, the American medical community is buzzing with rumors of gathering the accumulated health knowledge of the last one thousand years and storing both it and high-resolution medical pictures and data on optical disks.

Limitations and Potential

Granted, this new technology has the potential to bring about massive changes in our perception of data and its storage. However, one of the present limitations of CD technology is that it is very hard to make a CD drive that is capable of both recording, erasing previous material and re-recording new material in its place. Hence, all present CD technology is "read only"; once the recording medium is lasered, it remains that way permanently.

On the horizon, perhaps available by late 1986, is what has come to be termed WORM (Write Once Read Many times) CD units. However, CDs capable of being written to and erased or otherwise modified many times over are still in the laboratory and may not see the light of day for years.

It's not easy to "throw together" a CD ROM system either. With audio CDs, error rates of a couple bytes of audio data would pretty much go unnoticed. Not so with computer CD ROMs. One missing byte can mean the difference between last month's sales figures and a collection of numeric mash. Hence, the art of error detection and correction has to be studied and refined to a high degree of accuracy. This is a costly and time-consuming procedure, but one that seems to have been surmounted as far as the read-only CDs are concerned.

Another potential item to be overcome is the problem related to the massive quantity of data being stored and eventually searched for. With so much data to look through, even the best random data search routines on the fastest drives may take a relatively long time to reach the desired data.

• Sony and Commodore-Amiga are developing • an interface that will allow you to connect a CD player to your • Amiga.

Still another area of concern will be that of possible product shortages. CD technology is new enough that there are simply not enough manufacturers (of both the technology and the media) in place yet. With audio CDs becoming more common, manufacturers are going to be hard pressed to vamp up production lines to handle the expected interest in the computer CD ROM arena as well.

The Amiga and CD ROM

The CD ROM situation is a particularly interesting one as regards the Amiga computer. The Amiga's ability to manipulate and display massive amounts of text and numeric data at superior speeds, including graphical data, seems to allow for a meld of the new CD ROM technology and the likewise new Amiga technology. In fact, the Amiga's ability to give motion and split-second movement to programs may be preceding the CD ROM's ability to provide data fast enough to make motion happen. As we alluded to above, the present day CD ROMs will have to decrease the relevant data access and searching times in order to unite high-speed graphics with the existant CD ability to store massive quantities of binary data representing those graphics.

Another plus for Amiga/CD marriage would be in the Amiga's ability to display and control multiple windows of data combined with the placement of multiple related files on a single CD. It is quite likely that applications software will become available where one of these files might consist of text matter, another a high-resolution digital "photograph" or artwork, and a third, another file being opened for access or updating, all existing and being operated on at seemingly the same time. Such "software/hardware interplay" efforts have positive implications for such environments as CAD/CAM, engineering research, medical file management, real-time event analysis and a host of others.

The major obstacle preventing you from using a CD-ROM player with your Amiga is the lack of a compatible interface. According to sources in the industry, however, this situation could be rectified as early as the first quarter of 1986. Apparently, Sony and Commodore-Amiga are jointly developing an interface that will allow you to connect a CD player to your Amiga. In any event, you can be assured that you will see an Amiga-CD connection on the market in 1986.

Play Taps?

With the arrival of CD ROM, one's attention may naturally turn to the future prospects of the floppy and hard disk industries. It could be quite a shock to present media manufacturers to suddenly find that years of research and ongoing product improvement have been wiped from the boards by the introduction of a new technology that dwarfs their respective storage capacities. Factors that will govern the fate of the existing storage media include pricing, availability, reliability and, most importantly, the development of a true read/write CD drive. As with all new technologies, the cost of CD ownership will be great in the beginning, with costs dropping as user acceptance, mass production and other market dictums come into play.

Without a doubt, floppy technology will continue to exist, although the media may shrink even more in size, having already gone from 8- to 5 1/4- to 3.5-inch standards. Likewise, hard-disk technology will continue into the immediate future, but it is very probable that at some not-far-off date, hard-disk and CD technologies will cross paths with only one emerging as the long-term victor.

The Immediate Future

Early on, Write Once Read Only (WORO) CD ROMs will have appeal to a broad spectrum of mainly archival-type users to whom erasing written data will not be as important as having a tremendous amount of storage. It is to be expected that most users will not be content to merely be able to purchase CD ROM databases or other information for read-only purposes; after a certain point, demand for Write/Read/Erase technology, generated by the largest computer use sectors (including business and personal users) will explode.

By most predictions, desktop micro and super-micro users will benefit the most. Most CD ROM industry leaders already admit that this segment will be first to experience the benefits of this new technology. Indeed, Amiga users, among others, may have their first taste of CD ROM perhaps as early as the first quarter of 1986. When it comes to CD ROM technology, the old axiom "The Sky is the Limit," may not really be such an exaggeration.■

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Amiga Music Studio

By Peggy Herrington

Mimetics Inc. is introducing a series of modular music products that form a multilayered Amiga music system.

It's a well-known fact that the Amiga is musically superior to all personal computers on the market today. Its four-channel stereo sound system makes it a viable musical instrument in itself, but since it is, after all, a computer at heart, the Amiga is also quite talented at controlling electronic musical instruments with MIDI, the Musical Instrument Digital Interface standard. MIDI affords compatibility between different brands of electronic music-makers through the auspices of a personal computer. (For an in-depth look at MIDI, see *AmigaWorld*, Nov./Dec. '85, p.52.)

The perfect music system for the Amiga would naturally take advantage of both its internal sound circuitry and its MIDI management capabilities and offer instruction and applications for the aspiring as well as the accomplished musician (and everybody in-between).

Mimetics

This kind of flexibility and power is promised by a series of modular Amiga music products built around a form of operating system called SoundScape, which is integrated into the Amiga's own operating system. Several of the individual modules to this multilayered system are available now while others are still under development by its designers, Mimetics Inc., of Palo Alto, California. Although the company is young, its members' expertise is based upon a solid foundation in the computer music industry.

Mimetics was founded last year by the former senior software engineering and hardware development staffs of the Syntauri Corporation, the people who engineered and marketed the very successful alphaSyntauri MusicSystem for the Apple II series of computers. Mimetics' Director of Product Development, a surprisingly unprepossessing fellow named Bob Hoover, is intimately familiar with the Amiga: Bob assisted Sam Dicker of the Amiga Corporation in the development of the internal sound kernal for the Amiga. (An upcoming issue of *AmigaWorld* will feature an interview with these men on that subject.)

SoundScape

SoundScape, designed by Bob Hoover and Todor Fay, retails for $89 and is the controlling program for the entire Mimetics system. As such, it is the only module that you must have. It integrates and coordinates the system modules that come with it as well as those that are available separately. As an invisible real-time background process, SoundScape resides simultaneously with AmigaDOS and Workbench, and allows music performance or study utilizing either the Amiga's sound generators and/or sounds produced by electronic synthesizers under MIDI control. The Amiga's multitasking environment allows concurrent use of SoundScape and its modules with other programs, either music or non-music in nature. That adds up to unparalleled flexibility. The Amiga can be set up as a freely operating recording studio or as a personalized music instructor, while at the same time allowing the musician to perform other tasks, such as making notes on a word processor. ►

Photograph by Ed Judice

◄ SoundScape is much more than a transparent operating system, however. It controls basic recording and performance functions for all modules within the system and houses a multitrack music sequencer with a potentially unlimited number of MIDI-compatible tracks (available memory being the only limitation). Each track has features similar to those found on a standard tape recorder, such as play, record, mute, thru (a MIDI technique) and Match mode (explained below). Some of the advantages of storing music this way are that the individual notes that constitute a sequence can be altered with the resident SoundScape music editor, and the instrument sound, which is a fixed part of the music on tape, is digitized separately and can also be altered. In addition, digitized recording tracks, like those on a multitrack tape recorder, can be played against each other until the satisfactory combination is achieved.

Sampling and altering sounds requires only imagination and a good ear.

SoundScape's track display screen works in conjunction with other control screens to edit music and select the instrument that is to be played or recorded. Each track can receive or transmit 16 polyphonic channels of music information to or from any music peripheral supported by the system—a MIDI keyboard synthesizer, for example, or a drum machine. A simple time-oriented editing system in SoundScape allows cut-and-paste with the Amiga mouse, and any event recorded by the system can be examined and altered from this screen. Advanced features such as special effects processing are also available here.

Display Screens

Unique display screens are used in SoundScape to illustrate music and performance parameters that are important to various applications. Typical screens include a graphic piano keyboard that displays multiple tracks independently and simultaneously, and simplified music notation screens that show the music as it plays.

Incorporated into appropriate SoundScape modules, for example, are lesson screens that give hints and fingerings for a variety of instruments (guitar, flute, etc.), and screens that show chord names and other nomenclature. Note files with scale progressions and specialized music exercises for many instruments are included. Many displays are bidirectional in that notes may be selected with the mouse and transmitted to other devices and/or recorded by the sequencer. Abstract graphic displays that vary with the music will provide elegant "light shows" that can be tuned to the particular music being played at the time.

Match Mode

Match mode in SoundScape is designed specifically to assist an aspiring musician in developing performance technique without the aid of a human instructor. A musical track is recorded, perhaps by a more skilled performer, or if that's not possible, by the student himself at a slow tempo with the aid of SoundScape's built-in metronome.

This is possible because, unlike records and tape recordings, musical pitch is not affected when the tempo of synthesized music is adjusted. The student selects the tempo, enables Match mode and plays along live with the recording as it sounds. When performed on any of the input devices exactly as previously recorded, the music continues to play back, but should the student falter, the system will wait until the music is played correctly before continuing. The various instrument screen notation displays help the student correct any errors. This process may be repeated at varying tempos (usually beginning slowly and speeding up as progress is made) until the piece can be performed at its intended tempo. Since specific tracks of music can be played back or silenced in Match mode, all parts of a multi-instrument piece can be studied individually, or the student can perform one part live with pre-recorded accompaniment.

SoundScape's Match mode is operable with MIDI synthesizers, any keyboard that activates the Amiga sound system (as well as the computer keyboard itself) and screen displays that accept mouse input. In addition, it will work with an inexpensive note-following peripheral unit now in development that will accept input from a microphone from voice, wind or any other monophonic sources.

Peripheral Devices

Synthesizers and other electronic sound-producing devices equipped with MIDI are not the only peripheral devices that are supported by SoundScape. The Amiga's internal sound-generating system may be accessed through the computer keyboard itself, and a piano-type keyboard that plugs into the second game port and activates the internal circuitry will be available, as will the low-cost pitch follower mentioned previously. A modular system such as SoundScape is easily upgraded and programs and peripherals will be integrated as they become available.

Digital Sampling

One of the most appealing SoundScape modules is Mimetics' sound-sampling device, which will retail for under $100. This hardware/software combination uti-

lizes the Amiga's internal sampling capabilities to digitize sound, making it easy to alter. Sampling is most commonly used to produce unusual or unique timbres that can be manipulated tonally from an input device such as a keyboard—it's simply inventing your own instrument timbre. The potential sources are infinite because anything audible can be sampled (recorded), all the way from a barking dog to a cocktail party to water dripping in a sink. After being sampled, sounds may be altered easily in all respects (pitch, attack, release, etc.). Your ear is the sole judge of quality. With a sampling device, for instance, you can save baby's first babblings for posterity or record your own polyphonic musical performance to critique later as the Amiga plays it back. Sampling vocal parts requires excessive memory, but a digitized word or two could be added to instrumental tracks.

Sampling and altering sounds requires no understanding of the desired result—all that is necessary is some imagination and a good ear. Under development at Mimetics is digital sampling software that will allow the "mixing" of sounds to produce those that could not be produced by any instrument and programs that display and allow more sophisticated sound analysis and synthesis.

Music Education

Several music theory, ear training and musicianship courses are being integrated into the SoundScape system to allow individualized or self-paced instruction in these necessary music arenas. A specialized tool and environment development system will be made available to music educators who wish to retain a particular approach to teaching these subjects. Personalized learning systems that allow instructors to tailor courseware to suit specific goals and methods are easily incorporated into the SoundScape pseudo-operating system. Utilizing the screen and tools presented with various music education modules, it will be possible as well as practical to use SoundScape as an educational support system to normal classroom instruction, or as a free-form personal learning guide.

Music To Compute By

Whether you long to become a MIDI-maestro or you simply enjoy listening to good music, thanks to the sophistication and fidelity of the Amiga, SoundScape will transform your computer into a fabulously versatile music system as it plays file after file—in stereo—while you manage your business ventures with concurrently running software. Imagine how your productivity curve will climb when you jazz up your spreadsheet or rock 'n roll your database. And, if you really want results, use SoundScape to add a little heavy metal to your accounts receivable.

For further information, contact your Amiga dealer or Mimetics, Inc., PO Box 60238 Station A, Palo Alto, CA 94306. 408/741-0117.■

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Using Your Intuition

By John B. Fisher

Controlling the Amiga is a simple matter of selecting on-screen images to activate functions, or in other words, using your intuition.

One of the best features of the Amiga is that the user can interact with it, with little or no documentation. It is the Amiga Intuition software, of which the Workbench is an integral part, that makes this interaction possible. The Amiga is not the first to take advantage of this approach; however, it provides the best user interface presently available, both for users and software developers.

Getting Started

It is necessary to first "open" the Workbench disk. This is done by pointing to the icon of the disk (by moving the mouse until the pointer is over the icon), and then quickly depressing and releasing the selection button (left mouse button) once to indicate that you want to work with that icon.

To open the icon, two methods are available. The first is to use the menus that appear at the top of the Workbench screen. To initiate this, hold down the menu button (right mouse button); then, while keeping the button depressed, move the pointer to the word Workbench at the left-hand side of the Menu Bar. When you point to a menu name on the title bar, the related menu will automatically drop down on the screen below the pointer.

The first option on the Workbench menu is called Open. This can be selected by keeping the menu button depressed and moving the pointer down to that option. Once there, Intuition highlights that option for easy recognition. Releasing the menu button will select that item. It might sound complicated, but with a little practice, the process becomes, well, intuitive.

An easier approach is to move the pointer to an icon, then click the selection button twice in rapid succession. This is called "double clicking," and it allows you to select and open an icon in one easy operation. Although this is much simpler, other operations require the use of the menu system at the top of the screen. So it is important to know both modes of opening icons.

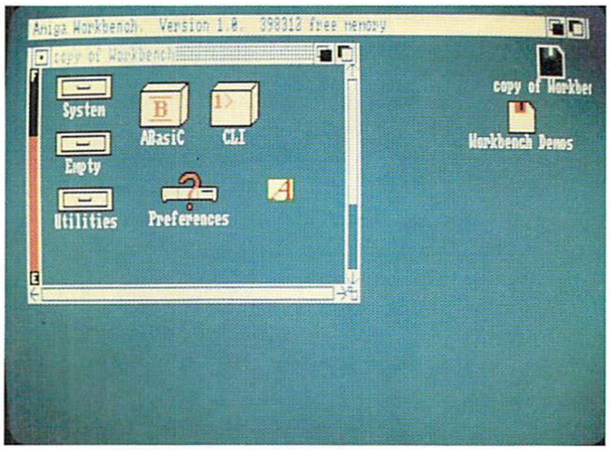
Once the disk icon is opened, the Workbench window will appear in the upper left-hand corner of the screen. A window is a rectangular area of the screen, which allows communication with and control of the opened icon. As with most other microcomputers, there is a combination of programs, files and directories on each disk. (A directory is a simple method of grouping together programs and files. The full list of files and programs will not appear until the individual directories are listed, unlike systems such as the Commodore 64, which keep all entries in one single directory.) The Amiga provides some interesting, and logical, names for these items. Programs are called *tools*; directories are called *drawers*. Files that can be manipulated by tools, and stored in drawers or disks, are called *projects*.

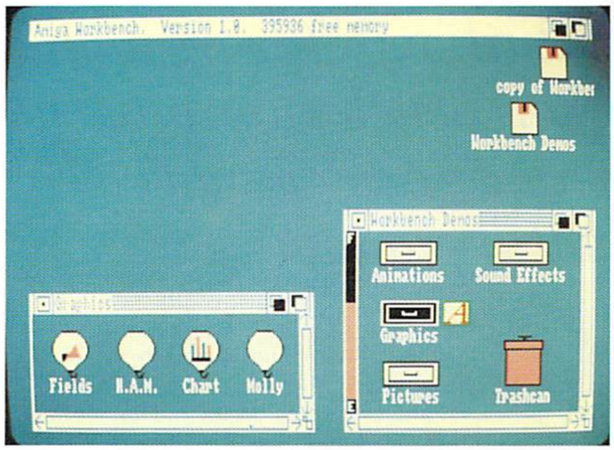
Gadgets and Windows

Around the edge of the window are the *gadgets* that allow you to control the window. These include (starting clockwise from the upper left):

- Close
- Drag Bar
- Back and Front
- Top to Bottom Scroll Bar
- Sizing
- Left to Right Scroll Bar
- Disk Gauge

The Close Gadget allows you to close an open window. To do this, move the pointer to the center of the box and press the selection button. Intuition does not actually close the window, but informs the program controlling it that it should be closed. This then allows you to save any changes that might have been made, or otherwise perform an orderly cleanup. Otherwise, the Intuition software can automatically respond to the selection and use of a gadget. The advantages are several. The first is that the interface is consistent, regardless of the tool, drawer or project being used. Second, the program that is controlling the display of the window does not have to be aware of changes to the appearance of the window or screen. By centralizing this into the Intuition software, the Amiga developers have removed a portion of the work from development of software that runs on a windowing and multitasking

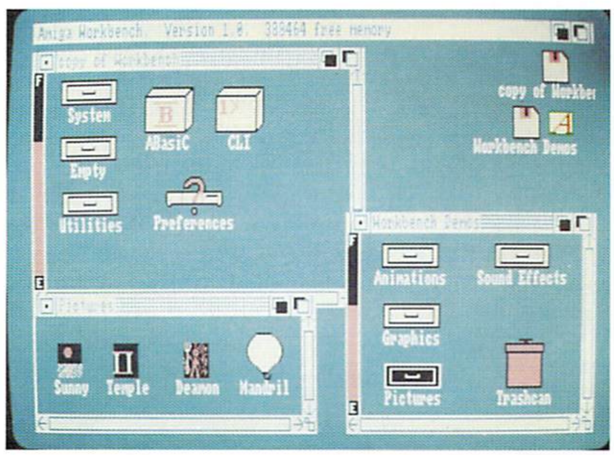




system. Therefore, it should be easier to develop and transport software to the Amiga than it has been for other windowing systems.

Between the Close and the Drag Bar gadgets is the title of the window. This helps you to identify and relate the window to its functions. The title and the Drag Bar gadgets can alternate in appearance between "ghosted" and "available" forms. They become available any time that the selection button is clicked when the pointer is within the window. This is an automatic side-effect of selecting an icon in the window, or using one of the gadgets along the edge of the window. If the window is not currently selected, then the title and Drag Bar gadget will be drawn with a series of unconnected dots, instead of solid lines. This is the ghost state.

The Drag Bar gadget allows you to move the window around on the screen. To move the window, move the pointer onto the Drag Bar, depress the selection button, and while keeping it depressed, move the pointer to the desired location on the screen. An outline of the window will follow the pointer, until you release the selection button. When released, the Amiga will update the screen and place the window in the new location. If many windows and tasks are active at one time, this can



take a couple of seconds, but the time required is usually minimal.

Another fascinating set of gadgets are the Sizing and Scroll Bar gadgets. To resize the window, depress the selection button and keep it depressed, while pointing ►

at the Sizing Gadget at the lower right-hand corner of the window; then, move the pointer to another location on the screen. An outline of the new window will be drawn while the selection button is depressed. Once it is released, the Amiga will redraw the window on the screen in the new size. If the Sizing Gadget is moved toward the upper left corner of the window, making the window smaller, a portion of the window will not be visible. To see all of the window, Intuition provides the top-to-bottom and left-to-right Scrolling Bar gadgets. By pointing to either of these and pressing the selection button, these bars can be moved along the edge of the window. Once the selection button is released, the Intuition software determines the distance moved with the Scrolling Bar, and then moves the contents of the window the corresponding distance.

With a little practice, using the Amiga, its Intuition software and Workbench environment will become second nature to you.

The Disk Gauge gadget is not something that can be manipulated with the mouse, but is used by the Workbench software to inform the user of the amount of disk space used and remaining on the opened disk, or "volume" as it is sometimes called. The objective with this gauge is to maintain enough disk space for any new projects or tools that need to be stored on the volume.

The Back and Front gadgets at the upper right-hand corner of the window allow the user to bring a window to the front or back of a stack of windows. This is similar to shifting a single piece in a stack of papers from the front to the back, or the back to the front.

Finally, each open window can have a menu assigned to it. While the menu button is depressed, window-specific menus will appear at the top of the screen. If no menu is available, then a blank line will appear at the top of the screen.

Workbench Icons

In the Workbench window, the following icons will appear:

- Preferences
- Clock
- Demos
- Utilities
- System
- Empty
- Trashcan

These icons can be grouped into three special categories: Tools, Drawers and Trashcan. Both the Preferences and the Clock icons are tools. The drawers, as explained earlier, are visual representations of directories on the disk. In the Workbench window, the Demos, Utilities, System and Empty icons are drawers that appear in this window. Although none are in the default Workbench window, projects may also appear.

To determine if an icon represents a disk, tool, drawer, trashcan or project, you can use the Info option on the Workbench menu, although it's usually not difficult to guess. A new window will appear, providing general information about the icon. This information utility is well documented in the *Introduction to Amiga* manual.

When you select icons that appear on the Workbench window, additional windows will be opened for each icon selected. Within each window, other icons may appear to represent new tools, drawers and projects. Thus, to access some functions, it is necessary to open the appropriate drawer.

The Trashcan icon is a special type of drawer. Although it is a standard directory on the disk, the Workbench software allows you to easily toss other items on the disk into the trashcan: Simply drag the icon of a program you want to toss out over the trashcan icon and release. If you later discover that you are running short of free space on the disk, you have the option of emptying the trashcan. This two-step process is an important feature, since the actual deletion of data is deferred until a later time. This means that anything tossed into the trashcan can be retrieved. On most other computers, it would be far too late at this point to stop the deletion process.

Controlling Icons

As the last paragraph implied, it is possible to move, or "drag," icons from one point on the Amiga Workbench to another. The movement can be from one point on a window to another point in the same window; or the destination could be another window associated with the same disk, or even a window associated with another disk. To move an icon on the Workbench surface, select and drag the icon to the new location while keeping the selection button depressed. If the icons are associated with the same disk, the data will be moved to the destination and removed from the source location. However, if the movement was to a location associated with a different opened disk icon, the data will only be copied to the new position, leaving the original alone. In fact, with two disk drives, it is possible to instruct the Workbench software to copy all the data from one disk drive to another, by dragging the source disk icon over the destination disk icon. Warning: This process destroys any data that might have been on the destination disk.

One other nice feature of dragging icons is the ability to tailor the appearance of the window to your own preference. To do this, first resize the window so that you have enough room to shuffle icons around, then arrange the icons where you want them. You can then record a "snapshot" of the icon locations, as well as the window size and location, by dragging them where you want them placed. Select all of the icons in the window

using a feature of the Workbench called "extended selection." This is done by keeping the shift key depressed while selecting icons in the window. Once all of the icons are selected, drop down the Workbench Special menu. By selecting the last option on this menu, the Workbench software will take a Snapshot of each selected icon, with the window placement and sizing. Once this is done, close the window and reopen it to test the new default arrangement of the window and the icons in it.

You might also want to try the Clean Up option on the Special Workbench menu. When you select this entry, the Workbench software will automatically rearrange the icons in the currently-selected window. The new placement depends upon the window size and dimensions. This is a quick method of cleaning up the window.

Finally, with the Workbench menu, it is possible to rename, duplicate or discard any of the icons on the Workbench. One word of warning about the Discard option on the Workbench menu: The Amiga will give you one last chance by displaying a requestor that warns you of the drawbacks to discard. There is no way to retrieve the data once it is discarded. As a result, it might be safer to toss icons into the trashcan instead of using the Discard option.

Controlling Screens

You will soon realize that some programs, when run, operate not within windows, but control the entire screen. One good example is the Preferences program. With Preferences open, you will notice that there are no Resize or Close gadgets. In order to exit the program you must, in this case, click the mouse on the box containing the word "Cancel." If you want to see the Workbench, or some other window, simultaneously with Preferences, you do have the use of the Back and Front gadgets, thus you can put Preferences behind one or more windows, allowing yourself access to the program icons in any window, as well as the Preference screen. The Change Printer and Edit Pointer programs available through Preferences are also full screens; they contain no gadgets and must be closed with the "Cancel" boxes if you want to exit them.

Workbench itself controls an entire screen, becoming the backdrop for whatever windows you open from it. Workbench, as with other screens (though not all, Preferences being a notable exception), can be "pulled down," like you would a window shade, to reveal whatever is behind it. This is done by clicking the mouse select button on the menu bar and while holding the button down, pulling the entire screen down. This can look pretty impressive if you have more than one screen running at once, and easily conveys the power of multitasking.

Requestors

It is necessary for a tool to communicate with you. The Intuition software provides *requestors* for this. These can be tailored to the needs of the tool, or the tool can take advantage of a fairly simple yes/no type of requestor. As an example, when the alarm on the clock is set, the tool will display a tailored requestor, which asks you to set the time for the alarm. The simpler yes/no requestor is used by the tool, which handles the duplication of disks. When it is time to insert a new disk, the requestor appears at the upper left-hand corner of the screen, requesting you to insert the source, or destination, disk. At the bottom of each requestor is a yes/no type of response.

System Alerts

Although developers try to make software "bullet proof," there are times when something will happen that no one ever anticipated. When that happens, it is entirely possible that the Amiga system could crash. When the Amiga detects that something is not quite right, it issues a system *alert*; this is a flashing warning issued at the top of the screen. There is a chance that it will be able to recover, as in the case of low memory. But not always. If the error is severe enough, the system will reset itself. When the Amiga resets itself after a system alert, any unsaved work will be lost. The Amiga asks you to wait until all disk activity is completed before responding to the system alert. This is vital, since failure to heed the warning can cause loss of data on the disk.

One of the most common causes of a system alert is lack of memory. No other personal computer in the Amiga's price range, or even quite a bit beyond it, offers the capability of true multitasking. Most allow only one or two tasks to be active at a time, with a master in total control at all times. However, the Amiga allows many tasks to be active at once, with the user as the controlling element. As the number of tasks increases, the amount of available memory usually decreases. This drain on memory can reach a critical stage. As a result, you must keep track of the memory meter at the top of the Workbench screen. If the amount of memory appears to be getting low, then it is wise to close down inactive and unessential windows. This often will provide the necessary relief from memory constraint. In addition, it helps to remove some of the demand on the processor.

With a little practice and a bit of work, using the Amiga, its Intuition software and Workbench environment will become second nature to you. It provides the ease of use that only comes with a clearly and carefully defined set of software.■

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Reviews

Deluxe Paint

Reviewed by Abigail Reifsnyder

Electronic Arts' graphics program has enough power and sophistication to please an artist.



When a program is the only one of its kind for a machine, it's a little tricky establishing whether credit for its good features should go to the hardware or to the software design. Having seen a preliminary version of another graphics program for the Amiga, however, I feel confident in saying that most of the credit for Deluxe Paint's surprising capabilities goes to the program's creator. Deluxe Paint offers more features, more flexibility and—most importantly—more nuance than one would expect from a personal computer program. Equally impressive is the sensitivity shown in the program's interface to we humans who will use it.

This is one of the only graphics programs I have seen that recognizes that we have two hands and can use them simultaneously to our advantage. Most of the menu bar commands are accessible from the keyboard—with single keystrokes—so that you can, for example, switch drawing modes while you draw without dragging down a menu option (a procedure which quickly becomes tedious if you're doing a lot of intricate work). Similarly, the program takes advantage of the mouse's two buttons in the icon selection area; the left button selects the icon, the right selects options, if any exist, for that function.

At first glance, Deluxe Paint looks like just about every graphics program these days—a kind of MacPaint clone. Running down the right-hand side of the screen are a set of icons for brushes, drawing, shapes and so on, along with the palette of colors. The menu bar at the top of the screen, selectable using the mouse's right button, offers additional choices that affect the overall drawing environment and allow you to save and load pictures and brushes. (One quick gripe: I believe that if you're going to have a menu bar, you should always be able to see it. Intuition requires that this menu bar disappear unless you press the right mouse button. Computer neophytes especially find this awkward, and tend to avoid menu bar options either because they forget they're there or because they press the wrong button all the time.)

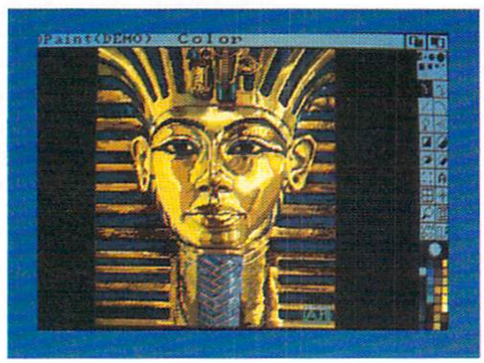
The similarities to MacPaint are only "screen deep" though, in part because of the two-button approach to the icons. For example, the first icon is a set of paintbrushes: four round, four square and two groups of dots. To select one of these brushes, you press the left button. If, however, you want a different size brush, you select a brush with the right button. The brush appears with the word "size" under it. You can then drag the mouse to enlarge or reduce the size of the brush, and it will remain that size until you select a different brush.

The next four icons—freehand dotted drawing, freehand continuous drawing, straight lines and curved lines—behave the same way regardless of which button is used to select them. The curved lines are particularly easy to manipulate. Rather than setting down the three points of a line, you stretch out a straight line, then use the mouse to drag the middle of the line out and around. This avoids a lot of the guesswork usually involved in creating curves.

The square, circle, oval and polygon icons all have a slash through them with one side empty and the other filled. One icon thus serves two functions: click one side of the square icon to draw an empty square; click the other side for a filled square. The net effect of using these double-functioning icons is that it requires less "screen real estate" (as software designers call it). That is, since less room is taken up by icons, you have more room in which to draw.

There is nothing extraordinary about the fill function except that it is very fast. (Credit for this goes to the folks at Commodore-Amiga.) On the other hand, the airbrush function operates more like a spray than any other I've ever used. You're not just drawing with a bunch of dots; rather, each time you press the mouse button, it releases and spreads a bunch of whatever brush and color you are using. Size of the nozzle can be changed using the right button.

The selection tool is used for both cut-and-paste (right button) and copy-and-paste (left button) functions. Any time you select an area (with either button), you can simply stamp out a copy of what you selected, or you can use that bit of your picture as a brush and paint with it. The program remembers that brush until you create a new one, or you may save it to disk for later use. While it is fun to play around with these brushes, their real power becomes evident when you play around with the different drawing modes (more on this in a moment).



Text can be entered using the 11 fonts selectable from the fonts menu. (There is no word wrap.) The grid icon activates an invisible grid that allows lines to be drawn only on the grid points. If selected with the right button, a section of the grid becomes visible so you can set the size yourself. This function is useful if you are drawing a diagram in which you want to be sure objects are properly aligned.

The symmetry function has two modes: Cyclic and Mirrors. The latter, and more familiar, mode draws all points in mirror image. In Cyclic mode, all points move in the same direction as the point you control. This little twist on a well-known theme means that things you draw in Cyclic mode don't always end up looking like the cut-out snowflakes we all made as children. You can select as many symmetry points as you want for either mode. The symmetry settings can be selected either from the menu bar or by clicking the right button on the symmetry icon. If you select symmetry with the left button, it will use the default settings (or the last you set yourself).

The magnifying glass splits the screen, showing the close-up on the right side of the screen. By clicking on the zoom icon with the left button, you can zoom in as closely as you want. Clicking the right button pulls back.

As in most graphics programs, the Undo function undoes the last thing you did. Clear clears the screen to the current background color, which brings us to another unique feature of this program—the color indicator. The dot in the middle of the indicator shows the current foreground color, which you select from the palette using the left button. The area around the dot is the current background color, which you select with the right button from the palette. The ability to carry two colors on your brush appears at first to be simply a convenient way to avoid trips back to the palette to select new colors. In fact, it allows for some interesting effects since the behavior of the background color depends on the current drawing mode.

So, what are these modes to which I keep referring? There are seven drawing modes: Mask, Color, Replace, Shade, Smear, Blend and Cycle. They are arguably the best features of the program. The first three affect the way your created brushes paint and are best described with an example. Let's say you've been doodling away using green and pink as your foreground colors and blue as your background color. You now take the selection tool to create a brush from a piece of your drawing in which all three colors appear. If you then draw with this brush in Mask mode, the brush will paint with all the foreground colors (green and pink—and black if this was your original background color and you haven't completely covered up the black area), making the background color (blue) transparent (invisible). If you switch then to Replace mode, the transparent, or current background, color (blue) will become visible. This only affects the most recent background color, so if you've used the background color to draw, then select a new background color, only this last one will become transparent.

Color mode allows you to select a foreground color from the palette to replace all but the transparent color of the brush. Thus, the area of your brush that was green, pink and black will be replaced with this new color. One use for Color mode is to create a shadow for your brush shape. If you stamp out a copy of your brush in Color mode, then switch to Mask mode and stamp out another copy on top of, but slightly off, the first stamp, the first stamp will appear as a shadow of the second stamp. All this sounds a lot more complicated than it really is; the best way to understand it is by using it. The result, however, is an incredible amount of control over your drawing tools.

In Smear, Blend and Shade modes, the color your brush produces depends on the colors over which it passes. These three modes alone are worth the purchase price of the program; they allow for the nuance I mentioned earlier. Smear does precisely what its name indicates: it smears colors together as if you were drawing with pastel crayons, then rubbed them together with your finger. Thus, if you have a green box next to a blue box, select Smear and rub with your brush back and forth over the edges of the two boxes; it pulls some of the blue into the green box and vice versa. If you use a very small brush to do this, you can effectively blend the two together.



Both Shade and Blend operate on a range of colors you select from the palette, so to use them you must first select the palette under control in the picture menu. You select the range by clicking SH, then the first color of the range. Then click on range and the last color of the range. Now, if you go back to your picture in Shade mode, the brush will change each color it passes over with the next highest color in the palette range you selected. (It will ignore colors not in the selected range.) Let's say, for example, you want to shade around a big blue circle. You would select a range of blues, then shade around the side of the circle.

Blend takes the colors over which it passes and puts down their average. Thus, you could use Blend to make the change between the blue and green boxes you already smeared even more subtle. To do this, you would select a range of colors between the blue and green of each box, then rub your brush in the smeared area. The brush will put down shades of blue-green and green-blue in this area.

Finally, Cycle mode works with cycle colors in the picture menu to create animated effects. If you selected the same range of blue to green from the palette for Cycle mode and drew with them, you could ►

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◀ then cycle the colors from the picture menu, creating the appearance of movement. (The disk comes with a picture of a waterfall for which cycling was used. While everything else in the picture remains static, it cycles through the colors used to draw the waterfall. The result is that the water appears to be flowing.)

You can not only select ranges of color from the palette, but also create the colors in the palette. If you select the palette from the picture menu, a box appears with six sliding controls. The first three control the amount of red, green and blue in the color; the second three, the hue, saturation and value (luminance) of the color. If you click on a color in the palette, this color will appear in an enlarged box above the palette so you can see how you are changing it. By sliding the controls up and down, you can change the color by, say, adding more red while taking away some blue. If you want a completely different color, the easiest way to change it is using the hue control. Saturation will affect the amount of white in the color, while value will affect the brightness of the color.

Thus, if you want a variety of shades of brown, you would first create a dark brown, copy it to another spot in the palette, then, say, ligthen it and add a little more red to it. You can then use the Spread feature to create a range of browns between your original dark brown and your light reddish brown.

If at any time you decide you don't like this palette, you have several options. You can "restore" the most recent palette (this is like Undo for the palette); you can use the default palette; or you can select the palette that was in use when you created your last brush.

Deluxe Paint allows you to work in two drawing areas at once; you can either draw two pictures or use the second screen to save objects you want to use later in your picture on the first screen. The Swap function in the picture menu lets you switch between the two. You can also merge the two screens together (back to front or front to back) with the transparent areas of one being filled with the other.

The brush menu includes a variety of functions to modify your created brushes (as well as save them and load previously saved ones). You can stretch, halve, double, double horizontally and double vertically its size, flip it horizontally or vertically, rotate it, bend it, sheer it and change its colors. (Most of these operations can be performed with single keystrokes as well as from the menu.)

The preferences menu lets you remove the menu bar and the control panel from the screen so you can look at your picture by itself (and, I assume, do a screen dump of only your picture). The brush-handle feature lets you determine whether you hold your brush in the middle or at an edge. Coordinates adds x and y coordinate readings on the menu bar. The most interesting feature in this menu, though, is fast feedback. People who have used drawing programs



before know that if you are drawing a box, say, with a large brush, the program moves awkwardly as it redraws the box over and over again with the large brush. Fast feedback avoids this by letting you use a normal size cursor to place your box, then drawing it with the large brush only after you have selected its position. This last feature is typical of Deluxe Paint: though really a very simple function, it makes drawing that much easier so you spend less time figuring things out and more time being creative.

There is so much power and flexibility built into this program that it could easily have turned out to be difficult to use. But the thoughtful interface—the use of icons, both mouse buttons and keyboard commands—make it really quite straightforward. You'll probably only need to read the manual to help you out with the modes, but once you understand them, you'll find hundreds of uses for them. Artists who see this program will find that some of their gripes with computer graphics are no longer valid, since you aren't limited to simply overlaying color. The ability to manipulate background colors, blend and smear colors, mix "paints" to create a custom palette—these are the kinds of things that painters love and miss in computer programs, and they're all here in Deluxe Paint.

An indication of how good this program is is how difficult it is to write a review of it. Any reviewer—software, movie, book or otherwise—will tell you (if he's honest) that it's much easier to pan something than give it a good review. This review was incredibly difficult to write.

Deluxe Paint

Developer/Publisher: *Electronic Arts*
2755 Campus Drive
San Mateo, CA 94403
415/571-7171

Video RoomMate Powered Speakers

Reviewed by Vinoy Laughner

High quality, great sound. . . high price.



The Video RoomMate powered speaker system from Bose Corp. was designed for use with TVs, VCRs, monitors or components needing amplification to drive speakers from audio output (tape decks, disc players, etc.). They are also well suited for the Amiga, since the Amiga can produce such high-quality sound and stereo output, and requires amplification for external audio output.

The speaker designated as "left" in the set has an amplifier enclosed in its cabinet. The amp generates approximately 25 watts per channel. The speakers have a maximum of 30 watts. (Adapters are available so that the speakers can receive their signals from either mono or stereo headphone jacks.) The left speaker plugs into a wall outlet for its power and to it, the "right" speaker is connected. Hooking up the speakers is simple; connection to the audio source and to the right speaker should be made prior to plugging in the system.

This set is *not* to be simply plugged into your stereo amplifier—a warning on the owner's manual states, "Never connect your Video RoomMate system to the speaker outputs of a receiver or amplifier. . ."; they are designed for non-amplified sources, or as mentioned above, with adapters for headphone jacks.

The speakers themselves are 9″ wide × 6″ high × 6″ deep. They are enclosed in cabinets of thick, high-impact plastic. The left speaker has a volume control; there is no tone control. (Tone can be controlled from the source of the audio signal.) As usual with Bose products, they are of very high quality. They seem to be very durable; the plastic is not cheap, but heavy and very hard. The fabric covering the speakers themselves is tough, but could be cut or punctured if abused. If you spend this much for bookshelf-sized speakers, chances are you won't be tossing them around; they should be securely attached and out of reach (especially if used in college dorm rooms).

They sound very good. Even at high volume, the sound is clear and crisp; bass is reproduced well, though at maximum volume, I detected some flutter when playing a tom-tom, or kettle drum, sound from an Amiga instrument program.

These speakers are quite an addition to an Amiga system, and impressively reproduce the stereo output. Since the Amiga is usable with video, these speakers would fit in well in such a set up.

The cost of this quality is no small one; $279 is more than many people will consider laying out for "bookshelf" speakers, although the fact that these have built-in amplification makes them much more than meets the eye. If you want to go deluxe, and can afford to, the Video RoomMate system will make your Amiga sound great.

Also available from Bose for use with the speakers are: Wall brackets, $19.95; Mounting arms, $39.95 (for mounting above a desk, shelf or table); Stereo/Mono RCA to 3.5mm headphone plug adapters; and a Travel bag (for speakers and accessories), $39.95.

The Video RoomMate Powered Speaker System

Manufacturer: *Bose Corporation*
The Mountain
Framingham, MA 01701

List Price: **$279.00** ►

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MaxiComm

Terminal program with Xmodem file transfer

Review by Bob Ryan

Telecommunications allows you to access the mountains of information available on bulletin-board systems and information utilities. All you need to get on line is your Amiga computer, a modem and a software package that controls the modem/computer connection. MaxiComm is a just such a package. Although it doesn't have many of the features of higher-priced telecommunications software, it handles the basic tasks of connecting to another computer and downloading or uploading information with ease.

To run the program, you simply insert the MaxiComm disk when your Amiga prompts you for a Workbench disk. MaxiComm contains a copy of AmigaDOS. You then select the MaxiComm icon and, after a few moments, you are in the program.

Pressing the right mouse button lets you see the MaxiComm menus. There are five of them: Project, Phone, Serial, Terminal and Transfer. To get on line for the first time, all you have to do is select Dial from the Phone menu. MaxiComm comes preset with the phone number of the Amiga Developers Exchange, so all you have to do is click Tone—or Pulse—dial from the Dial Requester. MaxiComm then has your modem dial the number. If the line isn't busy, you will connect with the Amiga Developers Exchange BBS.

If you want to dial a number other than the Amiga Developers Exchange, just click on the string gadget containing the number and enter the number you want to call. Then, when you click Tone or Pulse, MaxiComm will have your modem dial that number.

MaxiComm supports Hayes and Hayes-compatible modems. If your modem doesn't understand the Hayes-AT command codes, you will have to indicate this by selecting Modem from the Phone menu. You'll then have to enter the codes for your modem manually. This can be a chore, so I don't recommend MaxiComm to anyone who doesn't have a Hayes-compatible modem.

MaxiComm doesn't support auto-redial, nor does it allow you to store more than one phone number at a time. Creating log-on macros (activated with the function keys) is possible though difficult in Maxi Comm. If you need these convenience features, you will need a more sophisticated telecommunications package.

Under the Serial menu, you indicate whether you are connected to another Amiga or some other computer. You also use the Serial menu to set your communications parameters. MaxiComm supports baud rates from 300 to 9600, and various combinations of data bits, stop bits and parity. You can also choose XON/XOFF protocol.

The Terminal menu allows you to indicate whether you want full- or half-duplex communications, strip or add line feeds and carriage returns, or echo files as you send them. The Terminal menu allows you to tailor your computer to communicate properly with many different types of computers.

The Transfer menu gives you access to MaxiComm's powerful file-transfer utilities. MaxiComm supports the transfer of simple text files and of text and binary files using the popular Xmodem error-checking protocol. MaxiComm makes it easy to receive information and store it on disk or to send one of your disk files to a remote computer. Using MaxiComm, I had no difficulty downloading public domain software from the Amiga Developers Exchange and Delphi. I didn't even have to read the docs in order to use Xmodem.

To initiate a file transfer, you use the Transfer menu to indicate whether you are sending or receiving the file, whether the file is text or binary, and if you want to use the Xmodem protocol. If you are connected to another Amiga, you can choose an Extended-Xmodem protocol that automatically transfers any .info file associated with the file you are transferring. MaxiComm makes file transfer easy.

Although MaxiComm acts as an ANSI terminal, it doesn't emulate specific terminals like the DEC VT-200 series. MaxiComm also lacks direct support for auto-answer operation. Presently, MaxiComm supports a sizable window up to 78 columns wide or a non-sizable, 80-column display.

Given these limitations, MaxiComm is not the ideal package to use in a business or professional setting. Most people, however, have no need for a telecommunications package more powerful than MaxiComm. I recommend this package to anyone who wants to access bulletin boards and information utilities.

MaxiComm
MaxiSoft
2817 Sloat Road
Pebble Beach, CA 93953
408/372-1722
$49.95

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Best of Public Domain

Hack

Public domain software is a good deal. Whether free or pay-if-you-like, the price is hard to beat. This issue we feature a P.D. program called Hack; one that will either rouse the bold adventurer in you. . . or transport you to the fantods.

By David T. McClellan

People like bargains, to the extent that they often will spend more time and effort looking for a good deal than they save in cash. The Amiga is one such good deal, and it's a good deal of machine for the money.

Public domain software is another good deal. For the price of a long distance call, or the postage to mail a floppy, some programs can be had that rival commercial software in power and performance. P.D. software is available because programmers enjoy their work, turning out odd bits of code for personal use, some of which they decide to give away. In the past, these odd bits have included such fine programs as Ron Cain's Small C compiler, Columbia University's Kermit file transfer tool and terminal emulator, and Crowther and Woods' original adventure game. Also in distribution are "pay-if-you-like-it" pieces ("freeware" or "shareware"), such as Andrew Fluegelman's PC-TALK III.

In this series I will explore the full range of public domain software available for the Amiga. The first few articles will deal with software ported from other sources, (e.g., the IBM PC, Apple's Macintosh and Unix machines). Later, as the Amiga user community matures, I hope that programs written expressly for the Amiga will appear here. Given the amount of software already available, even being finicky I will have a lot to tell you about, in all categories. I dedicate this series to the programmers and hackers out there giving us their best.

Nodus Nocturnal

The topic of this article is not a compiler or terminal emulator. Instead, I'm about to describe a late-night sleep-waster known to the Unix community as *Hack*. It is to adventure games what Pac-Man was to Pong. Warning: It can be seriously addicting. I'm describing it in this first article for several reasons: It is relatively easy to port, I'm seriously addicted, and I am porting it to my Amiga now. If you're not into games, particularly ones that take a lot of coffee to solve, come back next time when I'll describe a different piece of software from another genre.

Hack is a screen-oriented adventure game. This means it draws a map of your surroundings on the screen as you explore, and you and the other actors in the drama move about on that map each turn. As the adventurer, your goal is to retrieve the Amulet of Yendor from the depths of a 39-level labyrinth. The labyrinth is full of monsters who are dedicted to stopping you, and contains the tools to defeat those monsters. (I know, so far it sounds like your standard adventure game.)

Hack's particular charm lies in the richness of its simulation, and in the sheer variety of things that you can do (and can have done to you). You have weapons, armor, magic wands, scrolls, rings, potions and other tools to work with. You suffer hunger, wounds, effects from certain potions and scrolls and foods, and in general have to juggle a fair number of "real/fantasy-world" variables to win.

Hack, now at version 1.03, was created by Jay Finlason, aided by Kenny Wood, Mike Thome and Hon Payne. They styled Hack after *Rogue*, another Unix-based, screen-oriented adventure game. Andries Brouwer, of the Stitching Mathematisch Centrum in Amsterdam, cleaned it up, added a lot of new features and has issued several releases of it over USENET, the user-driven Unix community network. I'm reviewing a version of his Unix 1.03, ported to the IBM PC and further improved by Don Kneller of Berkeley, CA.

Joining the Fray

Hack was originally written for CRT terminals attached to Unix hosts. It draws level maps and represents objects with ASCII characters, and almost all com-

mands are single keystrokes. Each class of object (food, weapon, tool, creature) is represented by a somewhat mnemonic character. A sample map of a partially explored level is shown in Figure 1, with a symbol key. (Hack itself can identify any symbol for you in plain English.)

Movement is always important, in games from chess to Donkey Kong. In Hack, you move for several purposes: to go places, to add objects to your pack and to attack monsters. You can move one square at a time in any direction, as well as up or down on staircases. You usually move one space per keystroke, but you can tell Hack to keep moving you in a given direction until you run into something interesting. This should be used with caution, as each move of one space counts as a turn and something can sneak up behind you while you're involved. Another hazard is randomly scattered sleeping gas and other traps, so you have to move carefully at times. Teleportation is a quicker way to get around, but you have to gain the ability first, and it uses up energy (food) faster. (*Nothing* in Hack is free except a speedy demise.)

You acquire objects by moving onto them. When you do so, Hack will attempt to add the item, or monster's corpse, to your pack (if it's too heavy, it will stay put). Automatic pickup can be dangerous; for example, picking up a cockatrice corpse will promptly convert you to a low grade of concrete, abruptly ending the game with Hack's tombstone. Even if a corpse is too heavy to pick up, you can move onto something to eat it. (I'll get to that later.)

Gross Encounters

You do a lot of fighting in Hack, along with a lot of running away. The deeper you explore, the nastier the creatures are against whom you must defend yourself. In order to fight a monster, you should be wielding a weapon; you attack the beast by attempting to move onto its space. You can also throw a weapon or vial of poison at it, if you're into hit-and-run tactics. Often the brute will do you the favor of attacking first, saving you the trouble of moving. You then continue to abuse it until either one of you dies or runs away. If *you* run away, the monster will come after you in hot pursuit, but running gives you time to heal—restoring your hit points to your current maximum. (Hit points measure how much damage you can take; your maximum increases with experience.) After you're back up to snuff, you can turn and whack the beastie some more, in the hope of doing it in.

Another trick is to get a dog to help you fight. You start every new game with a tame dog, which will follow you around and drool faithfully at your feet. My dog has saved my life more times than I can count—it will attack most minor monsters (and will happily bring you any parts it dosen't eat). If monsters are scarce, you have to make sure the dog is fed regularly, however, and a dog is no help with big monsters (mine hides behind me when he sees a xorn or a dragon).

Bon Appétit!

The monsters in Hack range from the fairytale fare of trolls, hobgoblins, dragons and unicorns, to odder sorts such as armor-eating rust monsters and worms straight out of Dune. Most of them will be familiar to anyone who has played fantasy role-playing games such as TSR Games' Dungeons and Dragons. One of the more whimsical monsters in Hack, and also one of the meanest and hardest to kill, is the nurse. (I think one of the game's authors once dated a particularly fierce nurse.) Nurses will usually beat you to a pulp, but paradoxically can be helpful if you encounter them in the condition you normally do in the real world (yes, I am being deliberately vague).

You restore your energy for fighting and running by eating; either by selecting an edible from your pack or by moving onto a monster corpse and digging in. (As in real life, fresh monsters are much tastier.) The longer an animal has been dead, the more likely it is to be rotten and make you sick. (As if stepping on something before you eat it wouldn't cost you your appetite anyway.) One other hint: different beasts often have special qualities or resistances, and eating them can give you those abilities. ►

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Key to symbols

–:	walls	?	scroll
+	doors	!	potion
#	passageways	/	wand
^	trap	k	killer bee
%	food, dead monster	d	dog
.	flooring	@	You, the adventurer
<	upwards stairs		

Figure 1. A sample Hack map with an explanation of the symbols.

◄ Several potions and foods can result in your becoming confused, after which you stumble about randomly until your head clears. One side-effect is that the effect of a scroll spell changes if you read it while confused (which is useful once you know what the alternate effects of the scroll is). For example (this is a free hint), a teleport scroll read under confusion will pop you up or down several levels rather than across the same level.

Hack adds to this mess by rotating the initial nonsense labels on all magical items for each new game. This means you don't know what a given type of thing is until you have used at least one of its type. This can make taking a drink very interesting.

Random Panoply

To handle monsters, and the rigors of adventuring, Hack provides you with all sorts of magical objects. There are numerous wands, potions, scrolls and rings. Wands carry a varying number of charges; potions and scrolls are one-shots and rings continue to work while being worn. There are good and bad varieties of each: Some wands will damage a monster while others will make it stronger; some potions will heal you while others will blind or sicken you. Rings can give you some sort of protection or vulnerability; bad ones usually weld themselves to your hand. There are also good and harmful scrolls—ones that increase the effectiveness of armor and weapons or tame monsters, others that rot your equipment or attach a ball and chain to your leg as "punishment."

Hack also provides more mundane tools: all manner of medieval weaponry and armor, pickaxes for digging, whistles for calling dogs and "expensive cameras" with which to blind and confuse an attacking fiend. Tools, magical items and food rations are found scattered about in rooms as you wander the labyrinth, along with gold and jewels. You can also purchase them for exorbitant prices in shops, which are scattered randomly throughout the levels.

Shops are rooms that can contain a bit of everything, or can be devoted to one type of item (bookstores for scrolls, walking-stick shops for wands, etc.). Shopkeepers are polite and obsequious, but they keep a sharp eye out for thieves, and they are harder to kill than almost anything else in Hack. (They must train in New York City.) It is possible to rip off a shop; this gives you quite a sense of accomplishment—for which you *should* be ashamed. Early on, it is easier and safer to pay for the goods; you can always return later with a pet dragon and do in the manager.

As well as giving you shops, Hack furnishes the occasional morgue where you are attacked by live monsters, killer beehives and magic money zoos full of hungry monsters and lots of cash, none of which you are forewarned about until you walk in and get ambushed. This is all to keep your reflexes sharp.

That's Entertainment

If you survive all this, somewhere in the mid-20's levels you will enter a real maze, where you must fight a minotaur, find a wishing wand under a rock, and figure out how to get down to the 39th level (there are no more stairs down). At the 39th level, the Wizard of Yendor awaits with the Amulet (the goal, remember). You must defeat him and his dog and climb all the way back up to level 1 to get out. All this in the name of entertainment. All in all, Hack is the best computer adventure game of its type I have ever played.

I'll close this description of Hack with a few hints from the rumors file (you get one every time you eat a fortune cookie):

"Quit" is a four-letter word.
Affairs with Nymphs are often *very* expensive.
Always be aware of the phase of the moon!
A rumor has it that rumors are just rumors.
Always sweep the floor before engraving important messages.
An elven cloak protects against magic.
Did you know that worms have teeth?
Eating a Wraith is a rewarding experience!
It might be a good idea to offer the unicorn a ruby.
Kicking the terminal doesn't hurt the monsters.
Most rumors are just as misleading as this one.
They say that a unicorn may bring you luck.

In the next installment, I'll be describing the version of Kermit I will have ported to the Amiga by then, and after that, some graphics. Until then, happy Hacking! ■

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Enabling Amiga

By Donald Labriola and John Meyer

An interview with Laura Hoffman of The Software Group, creators of Enable/Write for the Amiga.

The Software Group was founded in January 1983, in Ballston Lake, a rural community in upstate New York. In November 1984, they announced their first product, an integrated package for the IBM PC called Enable.

Enable was received enthusiastically, called by many the best of the second generation of integrated packages. It included a spreadsheet, a database manager, telecommunications software, graphics functions and a particularly powerful word-processing module (see p. 82).

Early in 1985, TSG entered into a confidential agreement with the Amiga system developers to port the word processor to the still-embryonic Amiga computer. In a remarkably short period of time, the word processor was completely rewritten in 68000 assembler, redocumented, repackaged and readied for sale for the Amiga as Enable/Write.

We recently had the pleasure of speaking with Laura Hoffman, TSG's charming and articulate Vice President of Marketing. Because of her unique position, Laura had the opportunity to interact closely with Commodore-Amiga throughout all phases of the development effort. In this interview, she describes her experiences with the people at Commodore-Amiga and discusses the Amiga computer and Enable/Write from her own insider's viewpoint.

Q: Who originally came up with the idea to port Enable over to the Amiga?

Laura Hoffman: I think this came out of mutual discussions between Ron Quake, who is the president of The Software Group, and the chairman of Commodore, Marshall Smith, who is a colleague and former boss of Ron Quake's.

Q: How long has this project been underway?

LH: We've been working on this since at least April. It has been a major undertaking.

Q: There has been a lot of talk about the Amiga's open architecture and how it will facilitate the efforts of third-party developers. How difficult was the actual task of translating Enable/Write to the Amiga?

LH: At the level at which we did the port, it was not an easy task. What we had to do was convert 8088 assembler code directly to 68000 assembler code, line by line. So in our special case, the open architecture did not really help us too much.

Q: So I assume you handled the entire rewrite yourself inhouse?

LH: Yes, we did it completely inhouse. The project was highly secret at the time because the Amiga had not yet been announced.

Q: Was the rewrite done by the same team that developed the original Enable system?

LH: We used some of the people who developed the PC system. The person who was the Senior Project Staff Member on this project was the same person responsible for the original conceptualization of Enable's environment and for most of the design and coding of the 8088 word-processing module that was ported.

Q: Did you run into many problems related to changes in the Amiga's hardware in the midst of your developmental effort? ►

LH: There were a few. We had difficulty figuring out how Commodore-Amiga was going to install software on the machine. Enable is a two-disk drive product and they were selling the Amiga with one drive. How were we going to load our software once it was written? But they were very cooperative and helped us solve the problem. We can now install Enable/Write on a one-disk system.

Q: How was the development and testing actually done, if you didn't have a completed Amiga to work on for much of the project?

LH: Well, we had versions of the Amiga machine in here for quite a while, but they've been developmental

Introducing Enable 1.1

When The Software Group released Enable for the IBM PC in late 1984, the package was thrust into an already-crowded market populated by heavyweights like 1-2-3, Symphony and Framework. Despite the intense competition, however, Enable did fairly well, aided in great part by virtually unanimous favorable reviews. Today, the product is building a significant and enthusiastic installed base.

Enable 1.1, the latest revision for the PC, is distinguished from most other integrated packages by a sophisticated coherency in its underlying design. Each module employs consistent user interfaces and can pass data transparently to any other module. The word processor, for example, can exchange data with the Database Management, Graphics, Telecommunications and Spreadsheet modules. Enable's intrinsic Master Control Module supports up to eight windows that can be sized, shaped, overlapped and zoomed to full screen. Users can access PC operating system commands directly from the Enable environment. The system includes a menu-generator, a context-sensitive HELP facility and interactive tutorials. Enable also boasts file compatibility with many of the most popular PC packages, including dBASE II, VisiCalc, 1-2-3, Wordstar, MultiMate and EasyWriter I.

The PC's Enable Graphics module can manipulate seven graph types with a plethora of colors, fonts and labelling options. The Telecommunications module provides VT-100 emulation, automatic buffering and support for a wide variety of communications equipment. The Database Management module is a full-function DBMS with an integrated command language, far more powerful than the limited 1-2-3-type database modules. The spreadsheet, although not that large (255 rows by 255 columns or adjustable up to 4,095 rows by 15 columns), is functionally comparable to the most popular spreadsheets on the market, and is extremely fast.

models. We did have to do a lot of the work on other types of machines, using cross-compilers.

Q: The Amiga and the PC are very different machines. Were there any functions that could not be implemented because of the dissimilarity of the two environments?

LH: Not that I know of. I believe we were able to transport every feature of the word processor onto the Amiga. Enable runs beautifully with 256K. We obviously had to change a few of the keyboard sequences used for certain more sophisticated commands, but for the most part, we did a one-for-one conversion. Enable/Write does not take full advantage of Intuition, the Amiga ►

In Spring 1986, TSG will begin supplying Enable/Write, the Revision 1.1 Enable word-processing module, to Commodore-Amiga for sale as a stand-alone system. (At the moment there are no publicly-acknowledged plans to put the other four modules on the Amiga.) Although the Amiga-based system will differ in a few minor instances from the PC version (some keystroke sequences will vary because of the different keyboard layouts), the two versions will be just about functionally identical. The main difference in the Amiga version is the absence of the Mail merge list-processing facility, which could not be implemented without the Database Management module.

Unlike many of the word processors found in integrated packages, Enable/Write functions well as a stand-alone system. In fact, it holds its own with the best of them. Enable/Write supports most of the word processing functions found in the industry standards, and also has a few unique features of its own.

Some of Enable/Write's capabilities include: adjustable margin and tab settings, rulers, block copy and move functions, positioned headers and footers, automatic pagination and footnoting, very flexible search and replace features, a "fast draft" mode that displays edited text as it will be printed, automatic indexing and table of contents, vertical scrolling, superscripts and subscripts, a variety of character sets, proportional spacing, a built-in calculator, sophisticated HELP facilities, and a variety of features that allow you to customize the system to your personal tastes.

In addition, Amiga's Enable/Write also takes advantage of much of the functionality of the Enable Master Control Module. With these added facilities, users can, for example, display and edit up to eight files concurrently, shuffling windows and moving text among the files at will.■

end-user interface, but the Enable user interface will be virtually identical to that of the IBM PC version. Enable/Write will be selected on the Amiga by icon from the main menu, but once you are in the word processor, it will look like the PC Enable word-processing product.

Q: Did you add any functions to take advantage of the Amiga's special features?

LH: Yes, we are adding mouse support.

Q: Who was responsible for documenting the new software?

LH: TSG. We had to rewrite the documentation for the word processor because the existing documentation was written expressly for the entire integrated Enable package.

Q: Apple's Macintosh has been on the market much longer than the Amiga and is slowly building a respectable installed base. Why didn't you choose it instead of the Amiga for your next system?

LH: I think the Amiga is giant steps ahead of the Macintosh in terms of features and capabilities. I'm sorry that some people are even putting it in the same general category as the Mac. There's no comparison. I think the Amiga's a whole new world in personal computer machinery.

Q: Why didn't you go with the new Atari 520-ST, which didn't look too different on paper from the Amiga at one point?

LH: I think it's turned out that the Atari machine doesn't compare with even the Macintosh. Bear in mind also that we were in negotiations with the parent corporation of Amiga for some time trying to arrange a cooperative effort. We have never been interested in doing the same with the manufacturers of the Atari. Our decision to port to the Amiga was based, not only on the technology of the machine, but also on the organization behind it.

Q: Why was only the WP section implemented at this time?

LH: It was simply a matter of time. We would not have had enough time to convert the entire package to come out in conjunction with the release of the Amiga. The word processor was the obvious choice as the business productivity tool to have available with the machine when it was first shipped.

Q: Are you hoping that Enable/Write will play a key role in helping the Amiga to find its target market, the way, say, Lotus was so important to the IBM PC?



In another place, in another universe, on a different ripple of the cosmic void, there exists a world with people not unlike ourselves, with computers not unlike the Amiga and with magazines not unlike this magazine. There is a sun traveling around their planet in much the same manner that our sun travels around our earth. There are wars, cars, Hollywood parties and body lice, just as we know them. There are spreadsheets, databases and word processors. There are printers, modems and hard disks. In fact, everything is pretty much the same as it is here, with a few exceptions.

In that world, someone like you is sitting in something like your chair reading a page something like this one. That person will eventually finish the magazine and go write an article about his computer. He will then send it to:

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(Even the addresses are the same in that world.) He will then eat an exact copy of your dinner, sleep in a duplicate of your bed and generally behave the way you do. He will live a mirror of your life and wait the same six to eight weeks that you would have waited if you had sent an article for review. At the end of that time, he will get a notice in the mail saying that his article was accepted and a check for three jillion plingsnarts* will be on its way (not everything is the same there). His money will come, his article will be published and he will become famous throughout the known universe.

Some time in the far future, a copy of the magazine will fall through a space warp caused by a careless janitor spilling his bag of nacho chips into the ventilation system of a charged particle accelerator, and it will cross over the quantum barriers of reality where a race of creatures will find it. After years of translating the text, they will become enthralled with the articles and go looking for the authors, intending to worship them as gods, unaware that they live in another dimension. They will land in your neighborhood, look you up in the phone book and come calling late at night (you and your counterpart share identical names and addresses). However, when they arrive, you will try to explain to the creatures that you have no idea what they are gurgling about. You will vaguely remember that a long time ago you had an idea for an article, but never got around to writing it. The creatures will become enraged, draw their weapons and turn you into a disgusting puddle of goo.

So, if you don't want this to happen to you, get up from your chair and get busy writing that article. Or, at the very least, send for a copy of our author's guidelines, and perhaps all this trouble can be avoided.

*Exchange rates may vary, but six jillion plingsnarts is approximately $250 to $900 standard earth currency.

◄

LH: I don't think that type of market environment exists any more. This has been proven by the way Jazz has not met the expectations of those who thought it would save the Macintosh. In today's market, I simply don't think people buy a piece of hardware just because one particular software package is available for it and vice-versa. I would hope that the Enable/Write package helps the Amiga through the door into the business market. The Amiga is much more than just a home computer and I think that Commodore-Amiga recognizes that they need to have a body of standard business software available to break into the business market.

Q: Who do you think will be buying the Amiga?

LH: I think the Amiga is an ideal product for the small-to-medium size business and for a vast array of specialty businesses. Advertising agencies, for example, can use it not only for standard business activities, but also for all of its fabulous graphics capabilities for design and so forth.

Q: Now that you've worked with the Amiga people for most of this year, would you like to continue your relationship?

LH: We look forward to a long, mutually-beneficial relationship with the folks at Commodore-Amiga. We're very impressed.

Q: In summation, what differentiates Enable/Write from the many other WP products on the market today?

LH: Enable has consistently been rated very highly, frequently coming in first among integrated packages and stand-alone products. There are any number of features in Enable/Write that we feel are outstanding, including its automatic indexing, table of contents, and footnoting functions, its ability to cut-and-paste blocks of text between up to eight files using its own windowing environment, and many, many other features. Enable/Write uses file formats identical to that used by the PC version, and it can even import files from other word processors like Wordstar. And the product is unbelievably quick, because it is completely written in assembly language.

Q: And this just in the first release.

LH: That's right. It's only going to get better.■

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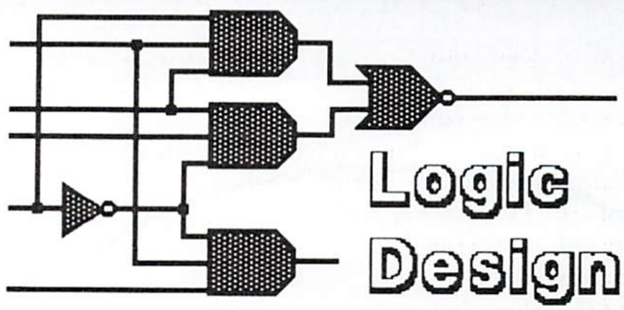
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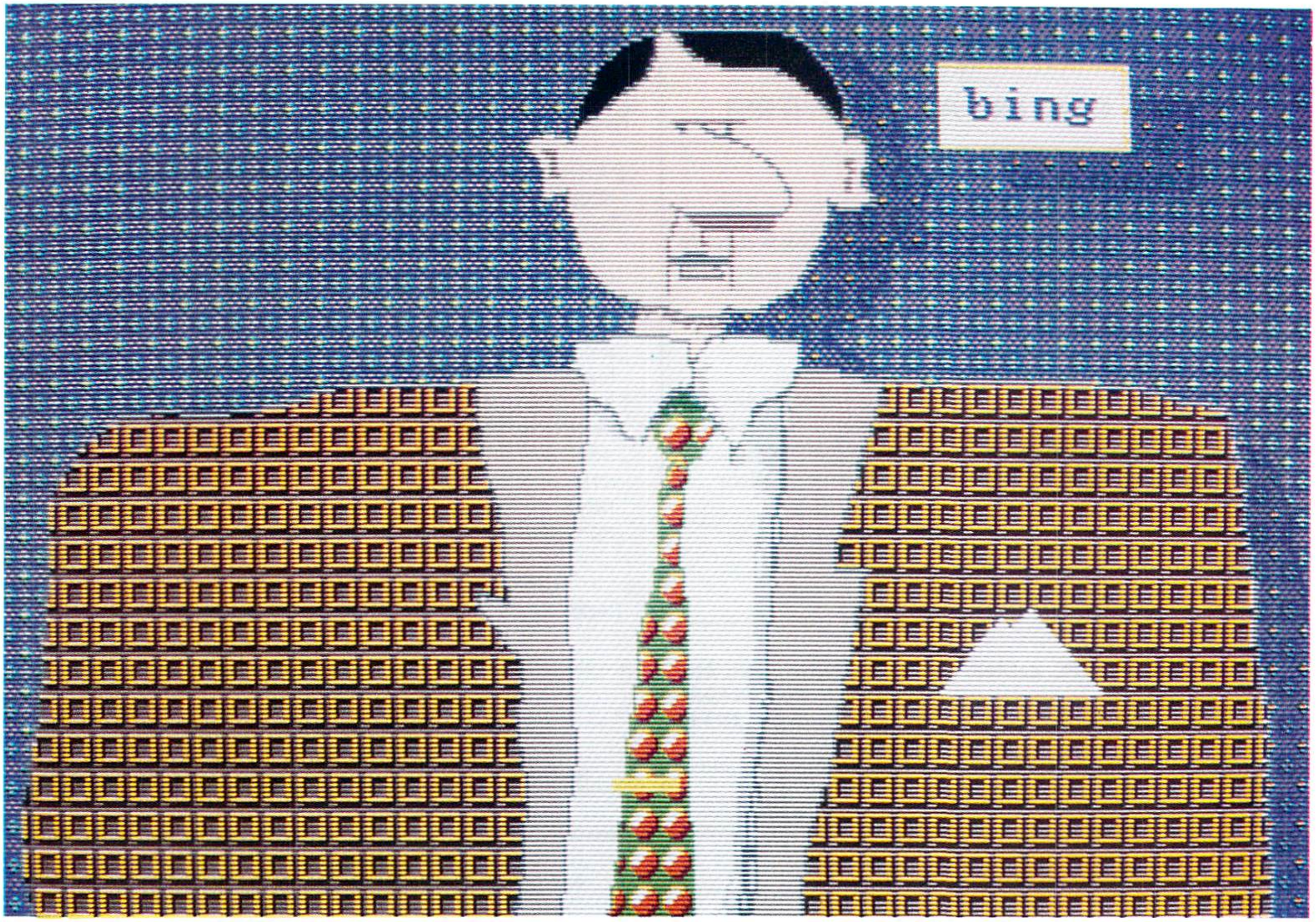
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What's New?

Compiled by Bob Ryan

Amiga Meets the 68020

The MC68000 microprocessor used in your Amiga 1000 computer is one of a family of processors based upon the same architecture. Others include the 68008, the 68010 and the 68020. The 68020 is the most powerful member of the 68000 family. Like the 68000, it features 32-bit internal registers. Unlike the 68000, however, the 68020 has a 32-bit external data path. This allows the processor to fetch and store 32 bits of data at one time, as opposed to the 16-bit limit of the 68000. The 68020 also supports virtual-memory addressing, allowing the processor to use an external storage device to simulate main memory.

While personal computer systems based upon the 68020 are still a year or two in the future, Computer System Associates is currently offering a piggy-back board that allows you to plug a 68020 into your Amiga. The **CSA 68020 Board** contains a 68020 MPU, a 68881 math coprocessor and three PAL chips. Since the 68020 is compatible with the 68000, the CSA board should run all of your Amiga software (what software there is). CSA reports a 200% performance improvement using the 68020 board in place of a 68000, and a greater than 500% performance improvement when running calculation-intensive software written to take advantage of the 68881 math coprocessor. The CSA 68020 Board is designed to work at speeds up to 12.5 MHz. It should have no trouble handling the 7.1 MHz clock of the Amiga.

To install the CSA 68020 Board, you have to open your Amiga's system unit and remove the 68000 processor. The board plugs directly into the 68000's socket. Because of this, the 68020 can't take advantage of its 32-bit external data bus. It is limited to the 64 pins used by the 68000.

Computer System Associates recommends the board for those who want to prototype a 68020 system or for anyone who wants to increase the performance of his or her system. Undoubtedly, 68881 support will be offered as an option in some Amiga software packages; especially computation-intensive software like spreadsheets and graphics. Amigas equipped with the CSA 68020 Board will have a speed advantage over other machines.

Upgrading your system with the CSA 68020 Board is expensive. The board costs $1,875 in single quantities. For more information, contact Computer System Associates Inc., 7564 Trade St., San Diego, CA 92121. 619/581-0316.

Amiga Accountability

Computers originally broke into the business world as accounting machines, and that situation has not changed significantly to this day. Like their mainframe cousins in the Fortune 500, personal computers are powerful yet simple accounting tools for small businesses. With the right software, a personal computer can help a small business tackle cash-flow problems, reduce bad debt and provide the quality information necessary to keep a business in the black.

Rags to Riches from Chang Labs is the first accounting system (and indeed some of the first software of any type) released for the Amiga. Rags to Riches consists of three modules that may be purchased separately or together as an integrated system. The available modules are for general ledger, accounts receivable and accounts payable.

The Rags-to-Riches Ledger program is a double-entry general ledger package. It can handle 5,000 accounts and 10,000 transactions. Ledger provides a number of different reports, including Income Statements, Balance Sheets, Account Journal, Account List and Transaction History. Ledger also accepts input from the Rags-to-Riches Payables and Receivables modules. Ledger is available for $199.95.

Receivables allows you to handle up to 5,000 customer accounts. It allows you to quickly identify overdue accounts to better manage your cash flow. It produces invoices and statements, and can produce reports on customer aging and invoice aging. Receivables costs $199.99.

Payables also handles up to 5,000 vendor accounts. It can schedule payments up to one year in advance, print as many checks as you like each month, and calculate discounts and taxes. It provides reports on cash requirements, vendor and invoice aging and many others. Like Receivables, it integrates easily with Ledger and costs $199.99.

Ledger, Receivables and Payables are available as a package for $499. For more information, contact Chang Labs, 5300 Stevens Creek Blvd., San Jose, CA 95129. 408/246-8020.

The Right Connections

The most frustrating thing about buying a peripheral device is the certain knowledge that you'll have to search high and low for a cable that will connect the peripheral to your computer. Well, Redmond Cable of Redmond, WA (naturally) is trying to take the guesswork out of buying cables for the Amiga by offering 20 different cables for your Amiga system. Redmond offers four parallel cables, three serial cables and 11 RGB cables. The RGB cables include connections for Sony, Zenith, Panasonic and even IBM digital monitors.

Redmond also offers a line of interface products for the Amiga, including serial and parallel switch boxes, smart serial cables and serial-to-parallel converters. For more information on Redmond products, contact Redmond Cable, 17371-A3 NE 67th Ct., Redmond, WA 98052. 206/882-2009 (or see your local Amiga dealer).

While on the subject of cables, Belkin Components is producing a shielded parallel printer cable for the Amiga. Designed to work with all major parallel printers such as Epson, Star Micronics, Okidata and NEC, the cable is available for $24.95.

You can learn more about Belkin Interface Cables for the Amiga from Belkin Components, 4718 W. Rosecrans Ave., Hawthorne, CA 90250. 213/644-3184. Outside California, call 800 2 BELKIN.

Color Printing

Okidata has a unique way of selling their color printer, the **Okimate 20**. They sell it in two pieces: the printer itself and a Plug 'N' Print module. The printer you get is the same that an Apple or IBM owner gets; the difference is in the print module. Each brand of computer has its own Plug 'N' Print module, allowing the Okimate 20 to print color graphics produced by a wide variety of computers. Okimate has recently announced a Plug 'N' Print module for the Amiga.

The Okimate 20 is a thermal-transfer printer; it melts the ribbon onto the paper using a 24-element printhead. This allows it to print on transparencies as well as regular computer paper. The Okimate 20 does not require thermal paper, although high-quality plain paper is recommended.

In Text mode, the Okimate 20 prints at 10, 12 and 17.5 characters per inch. It has an 80 character-per-second Draft mode and a 40 cps Correspondence mode. The Okimate 20 supports boldface, underlining and italics. It is, of course, supported directly by the printer drivers built into the Amiga.

The Okimate 20 can print any Amiga picture in living color. It can produce over 100 distinct colors. Printing graphics is slow (5–10 minutes per picture), but the results are very good.

The Okimate 20 costs $149 and the Amiga Plug 'N' Print module sells for $99. Black ribbons cost $4.95 and produce 50–75 pages of text. Color ribbons cost $5.49 and are good for about 17 pictures. For more information, contact Okidata, 111 Gaither Drive, Mt. Laurel, NJ 08054. 609/235-2600.

NewsBriefs

Commodore-Amiga began shipping **Version 1.1** of Kickstart and the Workbench to registered Amiga owners in December. If you don't have the new Kickstart and Workbench, bring a couple of blank disks to your dealer and he'll give you the update.

Included with Version 1.1 Workbench is **Microsoft's AmigaBasic.** Hopefully, AmigaBasic will make people forget ABasiC, with its bugs, unimplemented commands, terrible editor and slow performance.

If you're looking for an easy way to organize and store your Amiga disks, you have two products to choose from: **DiskBook** from MicroStore, PO Box 37, St. Peter, MN 56082, Tel. 507/345-7179 and **The Easel** from Innovative Technologies, 5731 La Jolla Blvd., La Jolla, CA 92037, Tel. 619/456-0722. DiskBook holds 32 3.5″ disks and costs $34.95. The Easel holds 20 disks and costs $19.95.

By the way, **MaxiSoft** won the *AmigaWorld* "Thank Heavens For Some Software" Award for getting the first completed third-party package **(MaxiComm)** into our greedy little hands. Second place went to Chang Labs for their Rags-to-Riches Accounting series. Third place went to Activision for Hacker and Mindshadow. Each of these developers will receive a really nice scroll from *AmigaWorld*. (Of course, we can't make the scrolls until Broderbund releases Print Shop.) Electronic Arts finished in the money with Deluxe Paint. (Maybe we'll send Trip Hawkins an *AmigaWorld* T-shirt.)

Congratulations to the winners! Now, what's the matter with the rest of you guys? ■

Help Key

By Vinoy Laughner

Afraid of what you don't know? Don't know where to turn with those persistent Amiga questions? Pack them up and send them off to Help Key, c/o AmigaWorld *editorial, 80 Pine St., Peterborough, NH 03458. Special thanks to Andrew Herrington and Rob Peck from Commodore-Amiga for the answers in this issue.*

Q: Will the operating system be put in ROM in future Amigas? How much will it cost for upgrades? This is confusing a good number of people and could anger uninformed purchasers. Many of us are waiting for a clear signal of Commodore's commitment to us concerning this question.

Claude F. Bissonet
Brattleboro, VT

A: Commodore-Amiga's intentions in this area are quite clear: In the foreseeable future, Read Only Memory (ROM) will not be substituted for the existing RAM-based Writable Control Store. There are no economic advantages for Commodore in making a change to ROM, and there are very real advantages to the customer in retaining the Writable Control Store. These advantages are already becoming apparent. The release of Version 1.1 of the system software provides new system features for software developers and eliminates bugs reported in Version 1.0, without the user having to open the machine and replace internal components to take advantage of it. As the Amiga gets better, the initial customers are not stuck with the original system software as they would be with a ROM-based system, and Amiga can provide software developers with extensions to the original software system as they become available and as needed. These advantages all accrue from the use of the RAM-based Writable Control Store.

There is no cost to the user in providing the updated system software—Commodore will send out the V1.1 software to registered Amiga users, or users can get updated by taking blank disks to their original Amiga dealer and getting a copy of V1.1. The new software on the V1.1 disk will replace the old software and will be substantially (though not totally) transparent to the user.

Q: Is Commodore-Amiga planning to release a printer for the Amiga?

Stuart Sanders
W. Los Angeles, CA

A: Commodore-Amiga has no current plans to release a printer specifically for the Amiga.

Version 1.1 of the Amiga system software supports a wide range of common printers, as follows:

Alphacom Alphapro 101
Brother HR-15XL
CBM MPS 1000
Diablo 630
Diablo Advantage D25
Diablo C150 (color inkjet)
Epson (dot matrix)
Epson JX80 (dot matrix)
HP Laserjet
HP Laserjet Plus
Okimate 20 (color thermal transfer)
Qume Letterpro 20
Custom—Default setting to a simple generic printer with no character translation.

These printers were chosen because either they represented de facto standards or had particular advantages when used with the Amiga. Since many recently manufactured printers can be set to one of the de facto standards (perhaps in addition to a proprietory 'native' standard), the user should carefully review his printer's handbook for information indicating that several standards/protocols are supported. If the printer appears to have settings (usually in the form of dip switches) for several standards/protocols, it is likely that one of the Amiga-supported de facto standard printers will be emulated by the user's printer when it has been set appropriately. A call to the printer manufacturer or to the dealer who originally sold the printer should then tell the user whether one of the printers listed in Preferences can be emulated by the user's printer, by dip switch setting adjustment. Sometimes a close emulation is possible, for example dot-matrix printers that emulate IBM printers work with the Epson setting, but do not have the Epson's italics.

So the suggestion is as follows:

(1) Review the Amiga Preference settings for the desired printer. If it's not listed:
(2) See if the printer can be adjusted to emulate one of the printers listed in Preferences.
or
(3) See if the printer can be adjusted to be sufficiently close to a Preference-listed printer to work satisfactorily (trial and error).
(4) If these suggestions don't work, the user has to:

A. Get the printer's supplier to

write a custom driver for the Amiga.

B. Write a custom printer driver! This is a significant task; it should only be undertaken by an experienced programmer. An example of such a driver is included in the new version of the ROM Kernel Manual that will soon become available.

C. Consider another printer.

Q: Is there any way to run C-64 and C-128 games on the Amiga? With a modem, could I communicate and share programs with a C-64 or C-128?

Greg Ottman
Hopatchong, NJ

A: There is no way to do this at present and no plans to make it possible in the future.

Q: Does AmigaDOS have a RAMdisk utility?

John Sapienza, Jr.
Associate Editor, *Different Worlds*
Washington, DC

A: AmigaDOS has a RAMdisk facility.

First some background. AmigaDOS has things called "Devices." There are two flavors of these—the first handles data streams (e.g., PRT:, SER:, the printer and serial devices) and the second, various kinds of filing system devices. These filing devices have the characteristic that they can create and maintain a directory structure exactly like that on a floppy disk. One of these filing devices is called RAM: and it is this device that provides the RAMdisk facility.

AmigaDOS's RAM: device automatically creates itself when you copy something into it and automatically adjusts it's size to suit the size of what you put into it. You can do anything with RAM: that you can do with any similar directory structure. Thus you could, with sufficient memory, duplicate an entire disk into RAM: and work with it as if it were a conventional floppy disk. Similarly, if you were doing a large number of operations using many of the C (Command) directories commands you could save disk access time by copying the entire C directory contents to the RAM: device and then not have to wait for the floppy disk to access each command. At the end of this work you could delete the RAM: device to make room for new programs.

Note that whilst RAM: upsizes itself automatically to accomodate incoming files it does not necessarily downsize the same way. If, for example, you copy three files to RAM: and then delete one of them, the resulting memory space will not necessarily be contiguously consolidated to reflect only the space needs of the two files. To get around this problem copy the unconsolidated RAM: device's contents to floppy disk then delete RAM: and copy the two files back into the (emptied by the delete operation) RAM: device.

Q: Atari is coming out with a 450 megabyte CD-ROM unit for the ST series. Will Commodore-Amiga produce a CD-ROM unit for the Amiga?

Interested
Pittsburgh, PA

A: Interfacing a CD-ROM player to the Amiga is not a difficult task. However, from the customers point of view it is important that Commodore-Amiga endorse a recording format and media accessing protocol that is likely to become an industry standard so that customers get the widest access possible to CD-ROM based material. This will avoid a situation like that now existing in the VCR industry in which two incompatible media formats exist (VHS and Beta). Commodore-Amiga's position is to actively review on-going developments in CD-ROM standards and in the availability of recorded material on CD-ROM, as new product plans are developed. It seems likely that independent vendors will develop CD-ROM players for the Amiga if market demand develops.

Q: I have just purchased an Amiga with 512K of RAM. I am really enjoying it, especially ABasiC, since I am an avid programmer. However, I am frustrated by the fact that I can't get a directory of my Basic disk, and there is no new icon shown in my Basic window when I create and save a new program. Am I doing something wrong, or is it impossible to get a directory or icon of my Basic programs?

Troy Williams
Wichita, KS

A: It is possible to get a directory in ABasic. Within ABasiC, simply issue the command DIR or DIRECTORY with the appropriate pathname in quotes following the command. This sends a directory listing to the current output device just like the similar command in the Command Line Interface (CLI). Basic programs appear as follows: "Program Name.BAS". In the CLI, the same command is used, producing the same results. See page R-147 in the ABasiC manual for full details.

ABasiC does not generate icons for its programs or data files.

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Coming Next Issue

The next issue of *AmigaWorld* will cover business and productivity applications ranging from reviews of business-oriented software to news about coming products to features about the business of writing programs for the Amiga. We will be pointing in the direction of possible solutions to problems—problems that most businesses face, as well as the problems of people who are using their Amigas in non-business atmospheres.

We will also take a close look at the Basic languages that are (or will be) available for the Amiga. Of course, there will be other things of interest in the next issue of *AmigaWorld*, but in the meantime, you'll just have to satisfy your hunger by re-reading this issue.■

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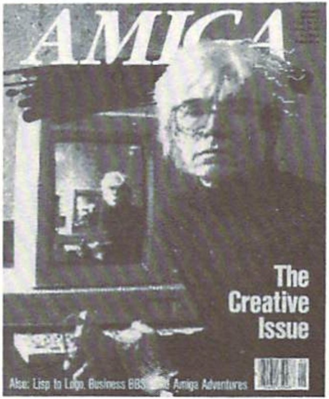
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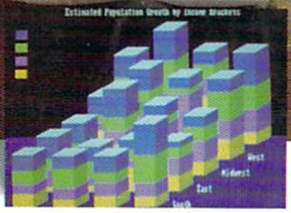
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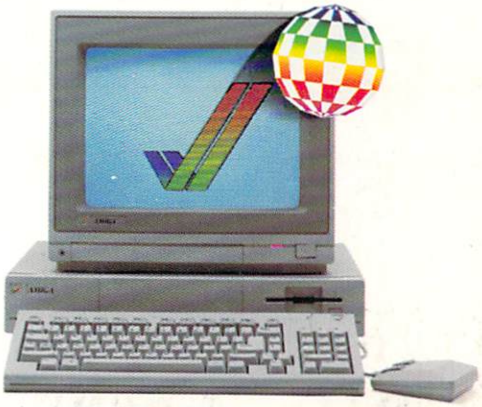
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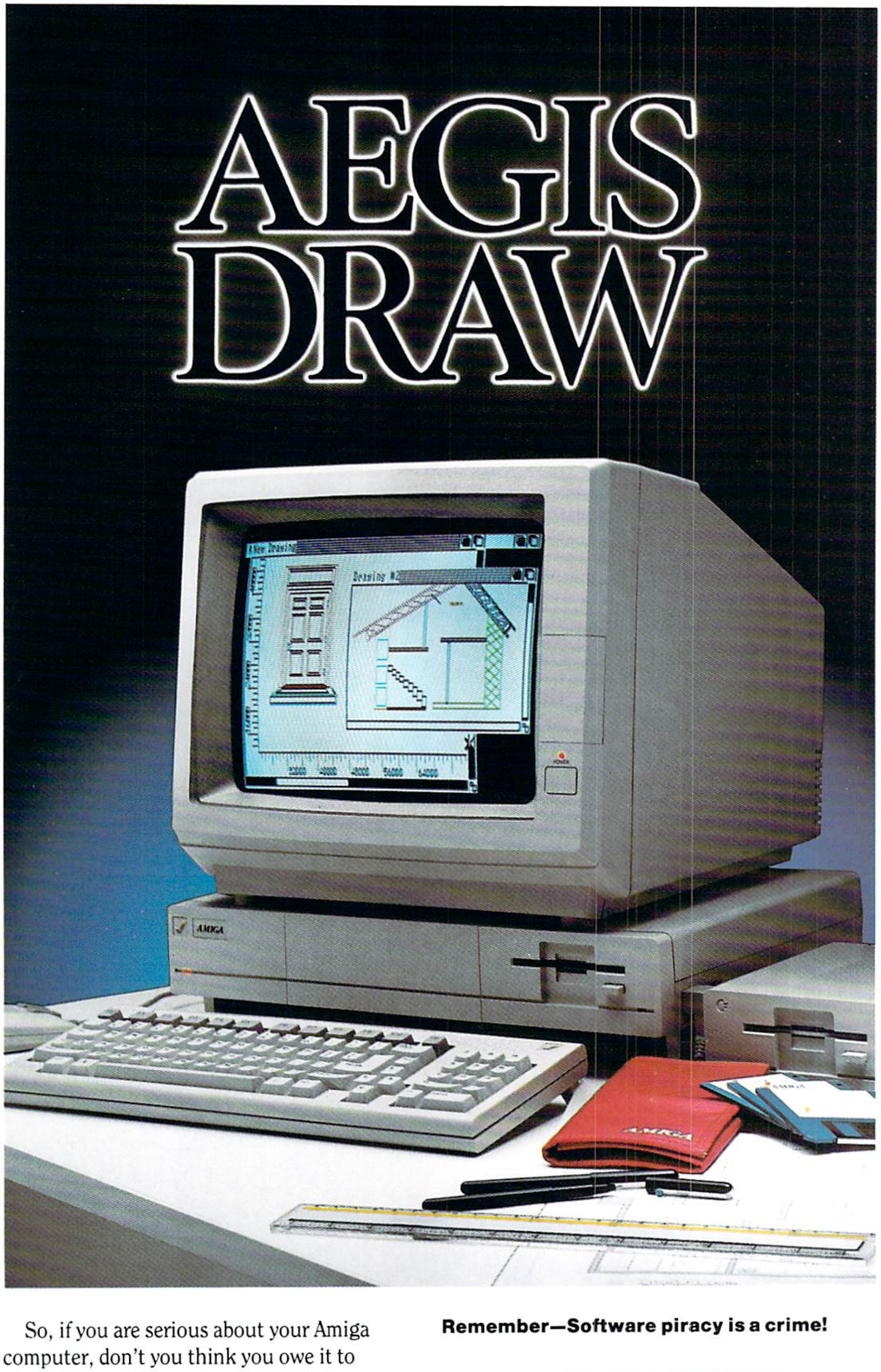
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